

INTERAGENCY STATE
BURNED AREA EMERGENCY RESPONSE
(BAER) REPORT

THE POOMACHA FIRE



Affecting watersheds in the
County of San Diego
CALIFORNIA

NON-CONFIDENTIAL
Draft

November 17, 2007

**INTERAGENCY STATE
BURNED AREA EMERGENCY RESPONSE
(BAER) REPORT**

POOMACHA FIRE

Table of Contents

Executive Summary	
BAER Team Organization	
Contacts List	
Specialist Report: Geology/Hydrology	
Resource Condition Assessment	
Emergency Determinations	
Mitigation Treatments	
Discussions/Summary/Recommendations
References	
List of Appendices	
Specialist Report: Biological.....	
Potential Values at Risk	
Resource Condition Assessment	
Emergency Determinations	
Mitigation Treatments	
Site Specific Recommendations	
References	
List of Appendices	
Specialist Report: Cultural	
Resource Condition Assessment	
Observations	
Emergency Determinations	
Mitigation Treatments	
References	

EXECUTIVE SUMMARY
THE POOMACHA FIRE
Affecting watersheds in the County of San Diego
California
November 16, 2007

The Poomacha Fire started on October 23, 2007 as a structure fire on the Lajolla Indian Reservation and spread through the Pauma Valley on to the lower slopes of Palomar Mountain, the northern slopes of Boucher Hill, and lower Doane Valley (County of San Diego, 2007). It burned approximately 49,410 acres and was declared contained the first week of November, 2007. 138 homes and 78 outbuildings and one commercial property were destroyed. There were 379 firefighters assigned to the incident resulting in 15 injuries. The estimated cost of the fire to date is approximately \$21 million. The fire burned throughout chaparral, Oak woodland/forest, grassland, riparian, and other wetland vegetation communities. Approximately 15,100 acres of the fire overlapped with the 2003 Paradise Fire burn area. As with the Witch Fire, the Poomacha Fire, aided by the Santa Ana winds, was a quick moving fire with an extremely rapid rate of spread.

A Burn Area Emergency Response (BAER) team consisting of resource professionals from a wide array of disciplines was established to assess the effects of the Poomacha Fire on three primary areas of focus: Life, Property, and Resources. The intent was to do a rapid assessment of the values at risk and offer recommendations that could help to lessen the potential for further catastrophic impacts of the fire and help to protect human life and property and critical cultural and natural resources. The BAER team did not intend to develop intensive site specific mitigations, but rather, identify areas of concern, risks to life, property, and critical resources on lands in and adjacent to the burned area in accordance with local/regional management policy guidelines. This assessment was done only within State Responsibility Lands (SRA - private lands) affected by the fire.

Because this fire was much smaller in size than the Witch Fire the SRA BAER Team assessed it in its entirety as one area. While it was a smaller fire, the main difficulty was the scattered parcels of private land within larger Tribal and Federal lands. The team was divided into three distinct working groups. The first was the Geology/Hydrology Group and was responsible for addressing issues related to Lives and Property. This group was comprised of Geologists, Foresters, Civil Engineers, Hydrologists, and Soils Scientists. Utilizing the Burn Area Reflectance Classification (BARC) maps, topographic features, the local knowledge of geologists on the team, and information from San Diego County, the team identified areas of high risk to human lives and property. Boundaries of jurisdiction were then identified, again, with emphasis upon private, non-public lands. The team then went to the field to analyze the areas of interest identified on the maps. The second group was the Resources: Cultural Group which was comprised of local

archaeologists from the Department of Parks and Recreation. At the end of each day this group would obtain maps and notes from the Geology/Hydrology Group and the following day evaluate these areas for cultural resources. The third group was the Resources: Biological Group. This group functioned in the same basic manner as the Cultural Group. It differed in that generally two of its members remained in the office gathering species specific information and other data while the other members went to the field. Information gathered from this process by each group was then evaluated to produce the individual Specialist Reports (see Specialist Reports). Additionally, the fire was flown by helicopter to assist in delineating private from non-private lands. When the initial ground work was completed members of each representative group developed a summary report. These reports contain recognition of potential values at risk, a general description of areas assessed by resource discipline, an explanation of the determination of each threat noted, and recommendations for first response mitigation.

In addition to the BAER Report, continued investigation and monitoring of risks to life, property, and resources by individuals with discipline-specific expertise is also highly recommended. Outreach designed to alert responsible governmental agencies as well as individuals in and immediately adjacent to the burn area to potential hazards and Best Management Practices (e.g., tree removal, drainage clearing, culvert flushing) to reduce those hazards is recommended. Development or tailoring an early warning system to inform these agencies and individuals of immediate threats to life, property, and resources associated with the Witch Fire is recommended.

BAER Team Organization

The planning team support group consisted of a cadre of professionals representing multiple agencies from the State of California. Agencies represented were the California Department of Forestry and Fire Protection (CAL FIRE), California Geological Survey (CGS), Department of Fish and Game (DFG), Department of Parks and Recreation (DPR), California Regional Water Quality Control Board (CRWQB), and Department of Water Resources (DWR). Team members were:

Kenneth Kendrick	CAL FIRE	John Schlosser	CGS
Al Klem	CAL FIRE	Will Harris	CGS
Nancy Magner	CAL FIRE	Craig Carlisle	CGS
Elsa Hucks	CAL FIRE	Janis Hernandez	CGS
Jeff Calvert	CAL FIRE	Erin Smith	Parks & Rec
Herb Bunt	CAL FIRE	Matt Mandich	Parks & Rec
Nancy Frost	DFG	Don Perez	Parks & Rec
Meredith Osborne	DFG	Mohammed Musazay	CRWQCB
Magdalena Rodriguez	DFG	Dat Quach	CRWQCB
Jeff Brandt	DFG	Steve Cain	CRWQCB
Maurice Cardenas	DFG	Andera Lobato	DWR
Debbie Carlisle	DWR	Ginger Lu	DWR

This cadre of individuals, representing multiple agencies performed their duties in an exemplary manner. All were enthusiastic and quickly became engaged in the

project objectives. They each performed tirelessly, respecting the input and occasional differing viewpoints of individual team members. Simply put, it was a group of individuals who continually showed a high degree of integrity and professionalism.

SRA BAER TEAM #9 CONTACT INFORMATION

Name	Organization	Phone Number	
		760-745-2061	
Cori Calvert	NRCS	X 102	Phone contact, attendance at team briefing
Jason Smith	SD Public Works	619-306-8148	Meetings/phone contacts
Cid Tesoeo	SD County	858-694-3672	Messages on voice mail
Jim Bennett	SD County	858-694-3820	Info on Landslides and other GIS
Tim Brownstone	CAL TRANS	619-573-7849	Phone contacts
Erv Gasser	US D of Interior		Fed BAER Team, meetings/phone calls
Darryl Martinez	BIA		Fed Baer Team. Met to exchange information
Chris Holbeck	Parks Service		Fed Baer Team. Met to exchange information
Mike Hale	SD Gas & Elect	562-335-5696	Phone contacts
Alex Ruiz	SD City Water	619-823-9799	Numerous messages, never connected
Mike Scott	Rancho Sanata Fe	Fire Prot D	Phone contact
			Personal contact by team, manager of land grant ranch
	Guejito Ranch		(name forgotten)
			Provided fire information from personal experience & knowledge of area.
Tom Porter	CAL FIRE	619-850445	

Native American Tribal Contacts

Clint Linton	Diegueno/Kumeyaay	760-803-5694	Phone contact, consultation on cultural issues
Carmen Lucas	Kwaaymii Laguna	619-709-4207	Phone contact, consultation on cultural issues
Mark Romero	Mesa Grande Band	760-782-3818	Phone contact, consultation on cultural issues

SPECIALIST REPORTS

LIFE AND PROPERTY: GEOLOGY/HYDROLOGY

TECHNICAL SPECIALIST'S REPORT – BURNED AREA EMERGENCY REHABILITATION

Resource: Geology

Fire Name: Poomacha-Witch Creek Complex
2007

Month/Year: November,

Author Name: Michael. A. Wopat

Author Title: Senior Engineering Geologist

Author Duty Station: California Geological Survey, 6105 Airport Road, Redding, CA 96001

Phone: (530) 224-4748; Cell: (530) 949-7714

The California Geological Survey (CGS) Burn Site Evaluation Summaries present the results of our reconnaissance of sites that may be at risk to life and property from geologic hazards such as landslides, debris flows, rock falls, and localized debris torrents, floods, and hyperconcentrated floods. These summaries do not include an assessment of potential risks from increased surface runoff along the major stream channels, and must be used in combination with hydrologists' assessments of those areas to grasp the magnitude of risks to high-value sites. CGS's expedited reconnaissance evaluations were part of the post-fire emergency response activities. As such, there are likely to be areas within the burn perimeter and other locations of potential values at risk that were not observed or assessed, and other areas where the potential risks are either higher or lower than our initial reconnaissance-level reviews.

I. Resource Condition Assessment

Resource Setting: The 49,411-acre Poomacha Fire affected 5,226 acres of Cleveland NF land and the 163,240-acre Witch Creek Fire affected 44,152 acres of Cleveland NF land. The 50,000 acres of Cleveland NF affected by the Poomacha – Witch Creek Complex are mostly underlain by Mesozoic granitic bedrock (gr, gr^t, gr₆ gr₃ = pink map units; Plate 1), with subordinate amounts of pre-Cenozoic hybrid rocks (gr-m = light-green map unit), pre-Cretaceous schist (ms = light-green map unit w vertical lines), and relatively minor amounts of Mesozoic gabbro (bi₁ = light-green map unit) and Recent alluvium (Qal = yellow map unit). The light-colored granitic rock mostly weathers to boulders of disintegration (Rogers, 1966), and an easily-eroded shallow to deep sandy soil (USDA, 1973). The gray to black gabbro weathers to deep reddish-brown loamy soil.

The northern part of the Poomacha Fire area includes part of the Palomar uplands (elevations exceed 5,500 feet) that are separated from foothills to the southeast by the northwest-trending Elsinore Fault Zone (Plate 1). The more-than 4,000 foot elevation differential between the uplands and the northwest-

trending San Luis Rey River valley 5 to 6 miles to the southeast results in oversteepened slopes near the uplands and along valley walls, major sediment origination and transport by debris flows from source areas on the steep slopes, and deposition of the sediment in the debris-fan deposits that form the northeast side of a substantial part of the San Luis Rey River valley in this area. Any fire-related increase in runoff would result in a concomitant increase in debris-flow occurrence and deposition, potentially threatening infrastructure and residents located along the streams and channels carrying the debris flows.

The Cleveland NF Geomorphology Ecological Unit Inventory (EUI) shows mass-wasting or mass wasting/fluvial erosional map units within the Poomacha Fire boundary on the over-steepened slopes (30% to >60%) along the southwest face of the Palomar uplands (Gallegos and others, 2001). Within the Witch Creek Fire boundaries, the Cleveland NF Geomorphology EUI shows mass-wasting erosional map units on the steep slopes (up to >60%) along (a) Quail Canyon (a tributary to the Temescal Creek in the Pamo Valley), (b) on the east side of Pamo Valley east and north of Almond Ranch, (c) on both sides of the linear San Diego River Valley drainage upstream of its confluence with Cedar Creek, (d) along a 2-mile-wide band extending southeast from that confluence, (e) along both sides of the steep-walled valley containing El Capitan Reservoir, and (f) on the south-facing slopes of the San Diego River Valley downstream from the reservoir. Mass movement would consist of debris flows originating on the steep slopes and rockfall from the steepest slopes moving downslope and depositing on the valley floor or into the reservoir.

When these areas covered by EUI mass-wasting erosional map units are compared to burn severity as indicated by the BARC map (accepted by the USFS and DOI BAER teams as sufficiently representing actual burn severity), the only area exhibiting mainly High and Moderate burn severity is that of the steep slopes on the southwest face of the Palomar uplands. The rest of the areas covered by EUI mass-wasting erosional map units exhibited a combination of unburned and low burn severity with minor localized areas of moderate burn severity and are not further addressed.

A. Initial Concerns

1. Steep debris-flow source areas on southwest side of Palomar uplands, the potential for fire effects to increase rates of debris-flow occurrence in these areas, and the resulting potential increase in risk to downslope infrastructure and citizens in the vicinity of debris-flow pathways.
2. Aqueduct conveying water from Lake Sutherland may be impacted by debris flows. As per concerns expressed by Jeffrey Pasek, Watershed Manager for The City of San Diego.
3. Residences on the Mesa Grande Indian Reservation (MGIR) downslope of Cleveland NF land about 1.5 miles north of Lake Sutherland in the SE¼ of Section 8, Township 12 South, Range 02

East, as per information provided by National Park Service geologist Brian Rasmussen.

Potentially hazardous sites in addition to these are currently being evaluated by State BAER teams and others.

B. Findings of the on-the-ground survey: Areas of the Poomacha, Witch Creek, and Harris Fires underlain by and adjacent to Cleveland NF land were observed and evaluated during a 1.6-hour helicopter aerial reconnaissance Sunday, October 28, 2007. The steep slopes on the southwest face of the Palomar uplands were reconnoitered Monday, October 29, 2007. The aqueduct between Sutherland Lake and the Cleveland NF boundary north of Ramona was reconnoitered and evaluated Tuesday, October 30, 2007. Limited reconnaissance of campgrounds in the Palomar area and debris-flow run-out areas southwest and downslope of the Palomar uplands was carried out Thursday, November 1, 2007. The MGIR residences and land upslope of them were reconnoitered Friday, November 2, 2007.

1. Summary of findings:

- a. Steep debris-flow source areas on Cleveland NF lands on the southwest side of Palomar uplands are underlain by pre-Cretaceous metasedimentary rocks (ms, Plate 1) south and west of Boucher Hill Lookout and by granitic rocks (gr¹) southeast of the lookout. The metasedimentary rocks in this area weather to well-drained cobbly fine sandy loams and the granitic rocks weather to coarse sandy loams and loamy coarse sands and areas of rock land (USD, 1973). Fire intensity ranges from unburned to High, being largely Moderate south and northwest of Boucher Hill Lookout and mostly Moderate or High southeast of the lookout. The low-cohesion soils derived from the bedrock in this area tend to fail in shallow-seated debris slides that convert to debris flows where sufficient water is present. Conclusion: Debris-slide / flow initiation rate may increase in the short term, subjecting downslope and downstream receptors to short-term increased risk. Note: additional comments are presented below in Section IV regarding possible debris-flow and flooding hazard to the La Jolla Campground at the confluence of Cedar Creek and San Luis Rey River in the La Jolla Indian Reservation.
- b. Aqueduct from Lake Sutherland. The aqueduct, located on north- and northwest-facing slopes along Santa Ysabel Creek, generally follows Black Canyon Road west and southwest from Lake Sutherland towards Ramona. Slopes above the aqueduct are underlain by granitic rocks (gr¹) that weather to thin coarse sandy loams and to rocky sandy loams and loams with clay-loam subsoils (USDA, 1973). Runoff is rapid to very rapid and erosion hazard is high to very high. The Cleveland NF Geomorphology EUI (Ecological Unit Inventory) shows the degree of instability on the slope crossed by the aqueduct to be Moderate (Gallegos and

others, 2001). Slopes range from 30 to 60 percent. Burn severity is Low on the upper slopes where debris flows tend to originate and generally Moderate in the lower half of the slopes.

Field observations found no evidence of recent debris flows. The watercourses do appear to be aggrading with fine sediment, however. The upper parts of the slope exhibit debris-slide / flow scars that demonstrate the propensity of these slopes to fail as shallow-seated debris slides / flows. Debris-flow paths are evident from the ground and from satellite imagery. Conclusion: The lack of evidence of recent debris flows and the Low burn severity of the upper part of the slopes that fail in shallow seated slides to form debris slides and flows suggests any increase in debris-flow activity on these slopes as a result of the Witch Creek Fire would be minor.

- c. Residences on the Mesa Grande Indian Reservation (MGIR) downslope of Cleveland NF land about 1.5 miles north of Lake Sutherland. A subdivision consisting of 21 new residences has been constructed on engineered pads on both sides of Scholder Creek in the E ½ of the SE ¼ of Section 8, Township 12 South, Range 02 East in Black Canyon since 2003. Of these houses, 8 are on the west side of the creek at the foot of what appears from the topographic map and available non-stereo imagery to be a large deep-seated landslide complex. This deep-seated complex seen in and near the appears to be very old, to not have moved significantly for thousands of years, and was likely active under a wetter climate, similar to ancient slides identified in the nearby Cedar Fire and discussed by Gallegos and others (2003).

Houses in the 8-house complex west of the creek are sited on the east side of the north-south street across from the mouths of east-flowing drainages that each empty into a broad conical drop inlet (DI) (Photo 1) on the west side of the street almost directly across the street from the front door of each of the 2 houses (Photos 2 and 3). Each DI is designed to convey water from the drainage into a culvert that passes eastward under the street and engineered house pad to discharge into Scholder Creek. A trash rack installed across the DI inlet protects each DI from plugging with debris.

Both drainages appear to have the capability of delivering debris flows to their respective DI, and, potentially, across the street to the residences indicated above. Debris slides/flows may originate in the headwaters of these drainages and potentially may be delivered to the DI at the mouth of the drainage and possibly to the street and the houses on the east side of the street.

Slopes in the headwater areas are in the slope category of 30 to 60 percent. Soils consist of a stony loam surface soil over a clay loam subsoil (USDA, 1973). Runoff is rapid to very rapid and the erosion hazard is high to very high. Burn severity in the headwater areas ranges from Low to High but is mostly Moderate.

Conclusion: Houses on the west side of Scholder Creek in the E ½ of the SE ¼ of Section 8, Township 12 South, Range 02 East in Black Canyon and their residents may be at risk from debris flows delivered to their street by the two parallel east-flowing drainages that each discharge into a DI on the west side of the street across from the houses.

II. Emergency Determination

For all the rock types exposed in the burn area, fire can increase dry ravel, surface erosion, and channel downcutting, which can heighten the potential for in-channel debris flows, debris torrents, and hyper-concentrated floods. The primary mechanisms for these processes are the loss of mechanical support of hillslope materials that was provided by vegetation and the increase in runoff resulting from reductions in infiltration and interception loss. Where soil burn severity is high, the formation of hydrophobic soils often results in reduction in infiltration. The loss of vegetative cover on potentially unstable slopes within the burn area also increases the potential for rockfall where slopes are steep enough. Because debris flows rapidly move downslope (commonly following existing channels) and often travel considerable distances from their initiation point, such mass movements can be particularly destructive. Where this potential slope instability exists in Moderate to High burn severity, this increased hazard typically persists for several years, although vegetation recovery should reduce the increased hazard significantly after the first rainy season (adapted from DeGraff and others, 2003).

According to DeGraff and others (2003), the likelihood of debris flows and rockslides due to loss of vegetative cover is highly dependant on the nature of the storm event. Debris-flow initiation requires satisfying a number of conditions that include: sufficiently high antecedent moisture conditions (bringing the unconsolidated surface material to near saturation), storm duration, and storm intensity (rainfall rate). Because these initiating conditions are not predictable over the next year, the emergency identifications here are wholly dependant upon physical conditions associated with slope stability and associated values at risk.

Findings: Steep slopes on the southwest side of the Palomar upland exhibit mostly Moderate to High burn severity and the headwaters of the east-flowing streams that discharge onto MGIR land in Black Canyon about 1.5 miles north of Sutherland Reservoir exhibit mostly Moderate burn severity. As a result, discharge and the rate of debris-flow initiation and delivery from these watersheds may increase in the short term, thereby potentially affecting downstream infrastructure and residents.

III. Treatments to mitigate the emergency

Table 1. Mitigations for the Values-at-Risk¹

Values-at-Risk	Objective	Description	Cost
1. Infrastructure and residents downstream of Palomar uplands	Protect the investment in infrastructure and prevent potential injury or loss of life	Advise downstream residents and owners of infrastructure of potential increase in debris-flow frequency	No cost to USFS; recommendation to NRCS and to DOI/BIA.
2. Lake Sutherland Aqueduct	Protect the investment in infrastructure	No mitigations needed	No cost
3. MGIR houses and residents	Protect investment in property and prevent potential injury or loss of life	Conduct more detailed evaluation of debris-flow risk to MGIR houses and residents; install barriers to prevent debris flows from crossing street	No cost to USFS; recommendation to NRCS and to DOI/BIA.

IV. Discussion/Summary/Recommendations

La Jolla Campground: Reconnaissance of potential downstream receptors of runoff and potential debris flows from the Palomar uplands resulted in reconnaissance and evaluation of the La Jolla Campground, located on the La Jolla Indian Reservation in the SW ¼ of Section 28, T10S, R01E, at the confluence of Cedar Creek² and the San Luis Rey River. The campground is located in the 50- to 150-yard wide flood plain of the San Luis Rey River immediately downstream of the confluence with Cedar Creek. A river-parallel lobate landform bordered with boulders that appear to have been pushed off of the landform to clear its upper surface and make it drivable is interpreted to be a debris-flow deposit. The channel of Cedar Creek where it enters the flood plain is bordered by a boulder-rich natural levee that is interpreted to consist of deposits from debris flows that traveled down Cedar Creek. Cedar Creek drains steep slopes³ north of the campground in Sections 23 and 14 that are shown by the BARC map to have burn severities of Moderate and High. The slopes are potential source areas for debris flows that could travel to the mouth of Cedar Creek and impact the campground. In addition, the San Luis Rey River reportedly is extremely flashy, and could potentially flood the campground during and immediately after extreme storm events.

The same campground appears to have been identified by the La Jolla Fire Baer Team (1999). They suggest that an extreme rainfall event could

¹Note that USFS mitigations can be carried out only on USFS land. Off-site mitigations are expressed as recommendations to agencies in charge of areas outside of USFS land.

² Note that this watercourse is identified as Luket Creek by small road signs where it is crossed by Highway 76. It is called Cedar Creek on the USGS topographic maps and on the Cleveland NF tourist map.

³ The steep slopes are shown on the slope map to be approximately 50 percent each of the slope categories (a) 30 to 60 percent and (b) more than 60 percent.

produce a debris dam on the San Luis Rey river within the campground, potentially affecting several campsites, the access road, and other property adjacent to the creek. Their recommendation, that a campground closure be considered during significant storm events, appears appropriate.

Recommendation: CGS recommends the La Jolla Indian Reservation consider closing the La Jolla Campground on the San Luis Rey River during significant storm events.

References:

- DeGraff, J.V., Koler, T., Bearmar, M., 2003, *Geology, Cedar Fire (Cleveland NF)*: Unpublished Technical Specialist's report for the Cedar Fire BAER Team, dated November 12, 2003, 5 p., Appendices.
- Gallegos, A., Levitan, F., Phillips, C., and Roath, B., 2001, *Southern California Province Landtype Association Ecological Unit Inventory*: Unpublished (?) report prepared for the Los Padres, Angeles, San Bernardino, and Cleveland National Forests, dated May 2001, 285 p.
- La Jolla Fire BAER Team, 1999, *La Jolla Fire BAER Narrative, Section IV*: Electronic file made available to Poomacha-Witch Creek-Harris Fire BAER Team, as updated 11/2/99.
- Rogers, T.H., compiler, 1966, *Geologic Map California, Olaf P. Jenkins Edition, Santa Ana Sheet*: California Department of Conservation, Division of Mines and Geology (aka: California Geological Survey), 1 Plate, explanation, Scale 1:250,000.
- Strand, R.G., compiler, 1962, *Geologic Map California, Olaf P. Jenkins Edition, San Diego – El Centro Sheet*: California Department of Conservation, Division of Mines and Geology (aka: California Geological Survey), 1 Plate, explanation, Scale 1:250,000.
- USDA (US Department of Agriculture Soil Conservation Service and Forest Service), 1973, *Soil Survey, San Diego Area, California*: 104 p., maps.

Fire Name: Poomacha Fire, San Diego County, California
Report Date: November 14, 2007
Authors: John Schlosser, California Geological Survey
Janis Hernandez, California Geological Survey
Steve Cain, CA Regional Water Quality Control Board, Los Angeles
Al Klem, California Department of Forestry and Fire Protection
Andrea Lobato, Department of Water Resources
Mohammed Musazay, California Department Water Resources
Dat Quach, CA Regional Water Quality Control Board, San Diego
Magdalena Rodriguez, California Department of Fish and Game

The California Geological Survey (CGS) Burn Site Evaluation Summaries present the results of our reconnaissance of sites that may be at risk to life and property from geologic hazards such as landslides, debris flows, rock falls, and localized debris torrents, floods, and hyperconcentrated floods. These summaries do not include an assessment of potential risks from increased surface runoff along the major stream channels, and must be used in combination with hydrologists' assessments of those areas to grasp the magnitude of risks to high-value sites. CGS's expedited reconnaissance evaluations were part of the post-fire emergency response activities. As such, there are likely to be areas within the burn perimeter and other locations of potential values at risk that were not observed or assessed, and other areas where the potential risks are either higher or lower than our initial reconnaissance-level reviews.

Executive Summary

The Poomacha Fire burn area contains a small number of high to moderate risks to life and property, predominately due to flood, hyperconcentrated flood, debris torrent, debris flow, rock fall, rock slide and tree fall. Residential structures built on or adjacent to steep slopes and in drainage channels pose the greatest risk to life. Paved and unpaved roads in and below the burn area, that cross drainage channels and that are the sole means of ingress and egress are common, at risk and, in turn, threaten both life and property. Utility lines appear to be at risk and merit additional evaluation.

Continued investigation and monitoring of risks to life and property by individuals with discipline-specific expertise is recommended. Continued and long-term interagency coordination is also highly recommended. Outreach designed to alert responsible governmental agencies and individuals in and immediately below the burn area to potential hazards and Best Management Practices (e.g., tree removal, culvert cleaning) to reduce those hazards is recommended. Development/tailoring of an early warning system to inform these agencies and individuals of immediate threats to life or property associated with the Poomacha Fire is recommended.

Potential Values at Risk

- Pauma Residential areas
- Cuca Ranch Subdivision

- Lilac Lane off Highway 76
- Dirt road at 42.5 mile post (N32.3900, W116.8934)
- Church Road off Highway 76
- South Grade Road
- Various buildings, including occupied homes
- Culvert and Roads
- Utilities

General Geologic Description of Witch Fire, including Pre-existing Conditions

The 90,440-acre Poomacha Fire is mostly underlain by Mesozoic granitic bedrock (gr, gr^t, gr₆ gr₃ = pink map units; Plate 1), with subordinate amounts of pre-Cenozoic hybrid rocks (gr-m = light-green map unit), pre-Cretaceous schist (ms = light-green map unit w vertical lines), and relatively minor amounts of Mesozoic gabbro (bi₁ = light-green map unit) and Recent alluvium (Qal = yellow map unit). The light-colored granitic rock mostly weathers to boulders of disintegration (Rogers, 1966), and an easily-eroded shallow to deep sandy soil (USDA, 1973). The gray to black gabbro weathers to deep reddish-brown loamy soil.

The northern part of the Poomacha Fire area includes part of the Palomar uplands (elevations exceed 5,500 feet) that are separated from foothills to the southeast by the northwest-trending Elsinore Fault Zone (Plate 1). The more-than 4,000 foot elevation differential between the uplands and the northwest-trending San Luis Rey River valley 5 to 6 miles to the southeast results in oversteepened slopes near the uplands and along valley walls, major sediment origination and transport by debris flows from source areas on the steep slopes, and deposition of the sediment in the debris-fan deposits that form the northeast side of a substantial part of the San Luis Rey River valley in this area. Any fire-related increase in runoff would result in a concomitant increase in debris-flow occurrence and deposition, potentially threatening infrastructure and residents located along the streams and channels carrying the debris flows.

Significant amounts of sediment can be expected to be transported into drainages and low lying areas surrounded by burned slopes during storm events (see CGS, Note 33).

The Cleveland NF Geomorphology Ecological Unit Inventory (EUI) shows mass-wasting or mass wasting/fluvial erosional map units within the Poomacha Fire boundary on the over-steepened slopes (30% to >60%) along the southwest face of the Palomar uplands (Gallegos and others, 2001). Mass movement would consist of debris flows originating on the steep slopes and rockfall from the steepest slopes moving downslope and depositing on the valley floor or into the reservoir.

When these areas covered by EUI mass-wasting erosional map units are compared to burn severity as indicated by the BARC map (accepted by the USFS and DOI BAER teams as sufficiently representing actual burn severity), the only area exhibiting mainly High and Moderate burn severity is that of the steep slopes on the southwest face of the Palomar uplands. The rest of the areas covered by EUI mass-wasting erosional map units exhibited a combination of unburned and low burn severity with minor localized areas of moderate burn severity and are not further addressed.

Average annual rainfall in the Ramona area, just south of the burn area averages about 16.5-inches annually, occurring mostly in the winter and spring season, with peaks generally occurring January through March. Review of historical rainfall records from the Ramona Fire Department monitoring station # Z05722800, shows that during the water year period (July 1 through June 30) with severe storm events, such as those in 1906, 1937, 1978, 1980, 1993, 1995 and 1998 water years, that between 27 and 30-inches of annual rainfall occurred, with the maximum rainfall of 45.89-inches during the 1906 water year, and a peak of 19-inches during January of that year.

For the Poomacha Fire, one day of inspection was performed by 3 teams, including geologists, water quality engineers, water resources engineers, and California Department of Forestry. Areal coverage of inspection included areas of private and county lands outside of the Cleveland National Forest and Native American Tribal lands.

Investigation proceeded across the fire area along public roads and private trails where accessible. Several locations were not able to be inspected due to access restriction.

Individual areas inspected with notable specific comments are identified in attached daily reports.

Follow-up efforts to identify specific issues and to implement remedies are essential to protect the public.

Determinations

The values at risk considered in this assessment include the possible loss of life and property due to landsliding, debris flow, rock fall, debris torrents and flooding from increased surface water runoff. It should be noted that these hazards are part of the natural process in this environment, and that these risks may have been present under pre-fire conditions. The potential for these processes to be exacerbated by fire is primarily dependent upon burn severity and slope steepness, both of which are variable in the Witch fire area. **The magnitude of post-fire damage will be determined by the intensity and duration of storms that impact the area.**

In addition to sites identified in Appendix A, the following areas may have increased potential risks from flooding or slope failures.

- South Grade Road
 - Moderate risk to road (debris flow, rock and tree fall, flooding)
- Dirt road at 42.5 mile post (N32.3900, W116.8934)
 - Moderate risk to road (debris flow, rock and tree fall, flooding)
 - Moderate risk to life and property (Pre-existing condition, rock fall)
- Various buildings throughout area, including homes
 - Moderate to low risk to occupants and properties (debris flow, flooding)
- Culverts and roads throughout area
 - Moderate to low risk to transportation routes (debris flow, flooding)
- Utilities throughout area

- Moderate to low risk to utility infrastructure, including power and telephone lines (debris flow, flooding)

Treatments

Particular treatment strategies need to be based on further analysis of area-specific hydrologic features and likely climatic events. City and County BMP's should be consulted for reference on site-specific treatments.

Recommendations

- Locations assessed as high risk to human life/safety should be followed up with additional site-specific investigations by appropriate licensed professionals.
- Appropriate agencies are encouraged to develop outreach programs designed to alert public officials, governmental agencies and individuals in and immediately below the burn area.
- The development of an early warning system to inform these officials, agencies and individuals of immediate threats to life or property associated with the Poomacha Fire is recommended.

In addition to the locations above and the specific sites presented in the CGS Burn Site Evaluation Summaries (Appendix A), the La Jolla Campground on the La Jolla Indian Reservation is identified as a high priority site needing further evaluation and mitigation:

La Jolla Campground: Reconnaissance of potential downstream receptors of runoff and potential debris flows from the Palomar uplands resulted in reconnaissance and evaluation of the La Jolla Campground, located on the La Jolla Indian Reservation in the SW ¼ of Section 28, T10S, R01E, at the confluence of Cedar Creek⁴ and the San Luis Rey River. The campground is on the 50- to 150-yard wide flood plain of the San Luis Rey River immediately downstream of the confluence with Cedar Creek. A river-parallel lobate landform bordered with boulders that appear to have been pushed off of the landform to clear its upper surface and make it drivable is interpreted to be a debris-flow deposit. The channel of Cedar Creek where it enters the flood plain is bordered by a boulder-rich natural levee that is interpreted to consist of deposits from debris flows that traveled down Cedar Creek. Cedar Creek drains steep slopes⁵ north of the campground in Sections 23 and 14 that are shown by the BARC map to have burn severities of Moderate and High. The slopes are potential source areas for debris flows that could travel to the mouth of Cedar Creek and impact the campground. In addition, the San Luis Rey River reportedly is extremely flashy, and could potentially flood the campground during and immediately after extreme storm events.

The same campground appears to have been identified by the La Jolla Fire Baer Team (1999). They suggest that an extreme rainfall event could produce a debris dam on the San Luis Rey river within the campground, potentially affecting several

⁴ Note that this watercourse is identified as Luket Creek by small road signs where it is crossed by Highway 76. It is called Cedar Creek on the USGS topographic maps and on the Cleveland NF tourist map.

⁵ The steep slopes are shown on the slope map to be approximately 50 percent each of the slope categories (a) 30 to 60 percent and (b) more than 60 percent.

campsites, the access road, and other property adjacent to the creek. Their recommendation, that a campground closure be considered during significant storm events, appears appropriate.

Recommendations (continued): CGS recommends the La Jolla Indian Reservation consider closing the La Jolla Campground on the San Luis Rey River during significant storm events.

Follow-up efforts to identify specific issues and to implement remedies are essential to protect the public.

References:

- California State Climatologist (website) [http://www.climate.water.ca.gov/climate_data/ftp.water.ca.gov/users/dfmhydro/Monthly%20Historical%20Rain/Z05 Ramona.xls](http://www.climate.water.ca.gov/climate_data/ftp.water.ca.gov/users/dfmhydro/Monthly%20Historical%20Rain/Z05%20Ramona.xls)
- California Geological Survey, CGS Note 33 – Hazards From Mudslides...Debris Avalanches and Debris Flows in Hillside and Wildfire Areas: (website) http://www.conservation.ca.gov/cgs/information/publications/cgs_notes/note_33/Pages/index.aspx
- California Department of Forestry and Fire Protection (website): www.fire.ca.gov
- DeGraff, J.V., Koler, T., Bearmar, M., 2003, *Geology, Cedar Fire (Cleveland NF)*: Unpublished Technical Specialist's report for the Cedar Fire BAER Team, dated November 12, 2003, 5 p., Appendices.
- Gallegos, A., Levitan, F., Phillips, C., and Roath, B., 2001, *Southern California Province Landtype Association Ecological Unit Inventory*: Unpublished (?) report prepared for the Los Padres, Angeles, San Bernardino, and Cleveland National Forests, dated May 2001, 285 p.
- La Jolla Fire BAER Team, 1999, *La Jolla Fire BAER Narrative, Section IV*: Electronic file made available to Poomacha-Witch Creek-Harris Fire BAER Team, as updated 11/2/99.
- Rogers, T.H., compiler, 1966, *Geologic Map California, Olaf P. Jenkins Edition, Santa Ana Sheet*: California Department of Conservation, Division of Mines and Geology (aka: California Geological Survey), 1 Plate, explanation, Scale 1:250,000.
- Strand, R.G., compiler, 1962, *Geologic Map California, Olaf P. Jenkins Edition, San Diego – El Centro Sheet*: California Department of Conservation, Division of Mines and Geology (aka: California Geological Survey), 1 Plate, explanation, Scale 1:250,000.
- USDA (US Department of Agriculture Soil Conservation Service and Forest Service), 1973, *Soil Survey*,

APPENDICIES

APPENDIX A-1

CA Geological Survey Burn Site Evaluation Summary (Fire: Poomacha, BAER #10, November 2007)

Notes: CU=Cuca, CH=Church

Road

[illegible]

APPENDIX A-2

Poomacha Fire, San Diego County, California
Team 9, Subgroup A Daily Report
November 11-12, 2007

Authors: Al Klem, California Dept. of Forestry
Magdalena Rodriguez, California Department of Fish and Game
Mohammed Musazay, Dept. Water Resources
Janis Hernandez, California Geological Survey
Steve Cain, Los Angeles Regional Water Quality Control Board

Location: South Grade Road

- Large watershed with steep to moderate slopes. Homes scattered throughout area; some burned structures. Moderate burn.

Potential Values at Risk

- Culvert and road
- Slope

Resource Condition Assessment

- High to moderate potential damage to culvert and road due to debris flow, mud slide, rock fall and flooding
- Moderate potential damage to slope due to erosion
- Moderate to low potential harm to structures due to mud slide and flooding

Recommendations

- Removal of debris in drainage to prevent debris flow, blockage of culvert, flooding and road erosion or washout.
- Re-vegetation of slopes, placement of straw mulch, sand and gravel bag berms or other BMPs to prevent erosion

Location: Dirt road at 42.5 mile post (N32.3900, W116.8934)

- Large watershed with steep to moderate slopes; Adjacent to Tribal Land. Homes scattered throughout area; some burned structures. Moderate burn. Numerous large stone fences/berms suggest pre-existing problems with drainage and erosion.

Potential Values at Risk

- Culvert and road
- Slope
- Structures

Resource Condition Assessment

- Moderate potential damage to culvert and road due to debris flow, mud slide and flooding
- Moderate potential damage to slopes due to mud slide and erosion
- Moderate to low potential harm to structures due to debris flow, mud slide and flooding

Recommendations

- Removal of debris in drainage to prevent debris flow, blockage of culvert, flooding, and road erosion or washout.
- Re-vegetation of slopes, placement of straw mulch, sand and gravel bag berms or other BMPs to prevent erosion

Location: Cuca Ranch Subdivision

- Large watershed with moderate to gentle slopes; several small drainages. Area developed as a Subdivision with scattered homes and unpaved roads. Numerous structures burned; Moderate to light burn.

Potential Values at Risk

- Roads
- Slopes
- Structures

Resource Condition Assessment

- Moderate potential damage to roads (mud slide, flooding, erosion)
- Moderate to low risk to life and structures (Pre-existing condition; mud slide, flooding)

Recommendations

- Re-vegetation of slopes, placement of straw mulch, sand/gravel bag berms or other BMPs to prevent mud slide, slope erosion, flooding

Location: Church Road off Highway 76

- Large watershed with steep to moderate slopes; Homes scattered throughout area; some homes burned. Paved and dirt roads. Moderate to light burn.

Potential Values at Risk

- Roads
- Slopes
- Structures

Resource Condition Assessment

- High to moderate potential damage to road due to debris flow, mud slide, rock fall, flooding, erosion and washout
- Moderate potential damage to slopes due to erosion
- Moderate to low potential harm to structures due to mud slide and flooding

Recommendations

- Removal of debris to prevent debris flow, blockage of culvert, flooding, road erosion or washout.
- Re-vegetation of slopes, placement of straw mulch, sand and gravel bag berms or other BMPs to prevent erosion

Location: Lilac Lane off Highway 76

- Large watershed with steep to moderate slopes; Homes scattered throughout area. Paved and dirt roads. Moderate burn; some burned structures.
 - Moderate risk to life and property (Pre-existing condition, mud flow, rock fall)

Potential Values at Risk

- Roads
- Slopes
- Structures

Resource Condition Assessment

- High to moderate potential damage to road due to debris flow, mud slide, rock fall, flooding, erosion and washout

APPENDIX A-3

Poomacha Fire

South Grand Road

Hazards to the road existed before the fire. The fire has increased the danger.

Sleep cut slopes. Soft soil.

Rock slide danger existed before the fire. The loose soft soil will increase the rock slide danger.

Land slides and debris slides possible.

Dirt road at location (N32.3900, W116.8934)

The road will likely get washed out.

This location is off the 42.5 mile post of South Grand Road.

Cuca

Land slide hazards. Pre-existing land slide hazard. Fire has increased the dangerous condition.

Some of the other houses in this area have similar problems of lesser magnitude.

There needs to be water breaks up slope of the homes.

Church Road off 76

Debris flows very likely.

Washouts possible.

Rock slides likely.

Lalac Lane off highway 76

House in the flood plain.

Pre-existing hazards.

Hazard level has not change post fire.

**California Geological Survey Burn Site Evaluation
Summary**

Fire Name : Poomacha Mt. Palomar Area
Bold where risks are high

**Meredith
Maurice
Jeff Calvert
Dat Quach**

**November
12, 2007**

Site number	At-risk Feature	Street address	GPS location		Hazard	Likeli- hood	Risk to lives		Risk to property		Recommendations for Infrastructure and Safety
			Latitude N	Longitude W			fire	pre- exist	fire	pre- exist	
Palomar 101	Road, Swale	Palomar Mountain State Park	33.33946	116.91896	Erosion , mud slide, debris flow, sedime nt loading	High	Low	Low	High	Low	Remove dead and dying trees on an ongoing basis to provide safety to public. Close roads in time of extreme rainfall to provide safety from possible unstable soil on slopes.

APPENDIX B-1

**California Geological Survey Burn Site Evaluation
Summary****November 12, 2007****Fire Name :** Poomacha-
Bold where risks are high

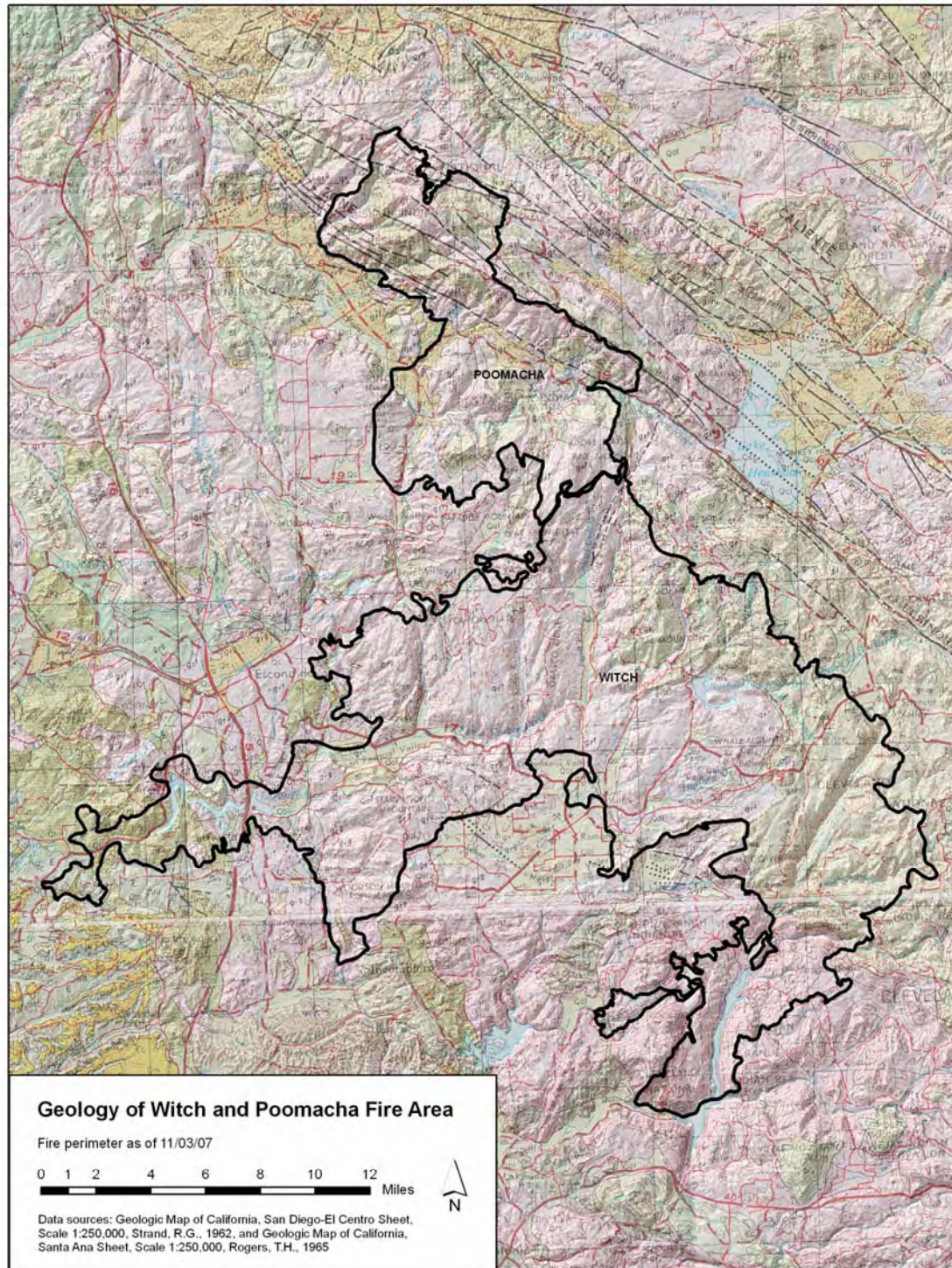
Site number	At-risk Feature	Street address	GPS location		Hazard	Likeli- hood	Risk to lives		Risk to property		Recommendations for Infrastructure and Safety
			Latitude N	Longitude W			fire	pre-exist	fire	pre-exist	
Pauma 101	House		33.34600	117.00332	Debris flow, Rock fall above house	High	High	Moderate	High	Moderate	High steep mountainside behind house with large draw aimed at house. No access available, needs greater review.
Pauma 102	Trailor and storage		33.34661	116.99944	Debris flow, Rock fall above house	High	High	High	High	High	Pictures taken. Trailor located at mouth of steep draw (5-10 acre watershed). There is a nice main residence 800 feet away with no risk.

Pauma 103	Several homes on debris fan		33.34264	116.99406	Debris flow.	High	High	Moderate	High	Moderate	Pictures taken. Large acreage watershed on steep slopes above large debris fan supporting homes.
Pauma 104	Culvert under Adams Drive		33.34136	116.99245	Debris flow, Torrent	High	Low	Low	Moderate	Low	Pictures taken. Two pipe culverts 18" and 24" debris basin and culvert inlets require removal of sediments. Much sediment already present. If road closes increases life risk to Moderate.
Pauma 105	24" Culvert		33.34023	116.99045	Debris flow, Torrent	Moderate	Low	Low	Moderate	Moderate	Debris and trees to be removed, culvert to be resized to accomodate water flow.

Pauma 106	Culvert under Adams Drive		33.33992	116.98746	Debris flow, Torrent	Moderate	Low	Low	Moderate	Low	Clean culvert and abandoned storage shed and pickup abandoned upstream of intake. Small instream basin upstream from culvert.
Pauma 107	2 Houses		33.33764	116.98967	Debris flow, Torrent	Moderate	High	Low	High	Low	Photos taken. Narrow channels next to house and garage.

APPENDIX C

MAPS



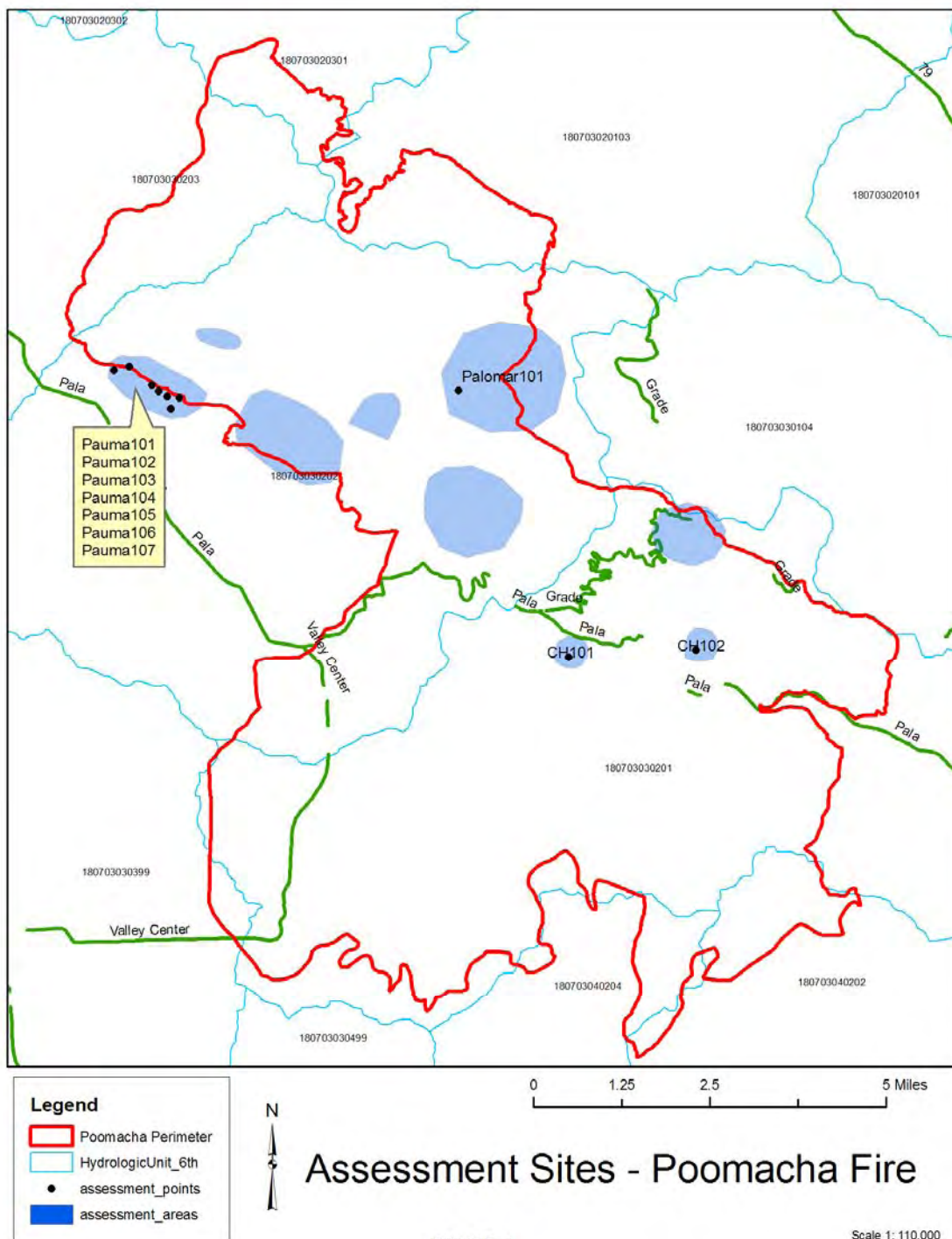
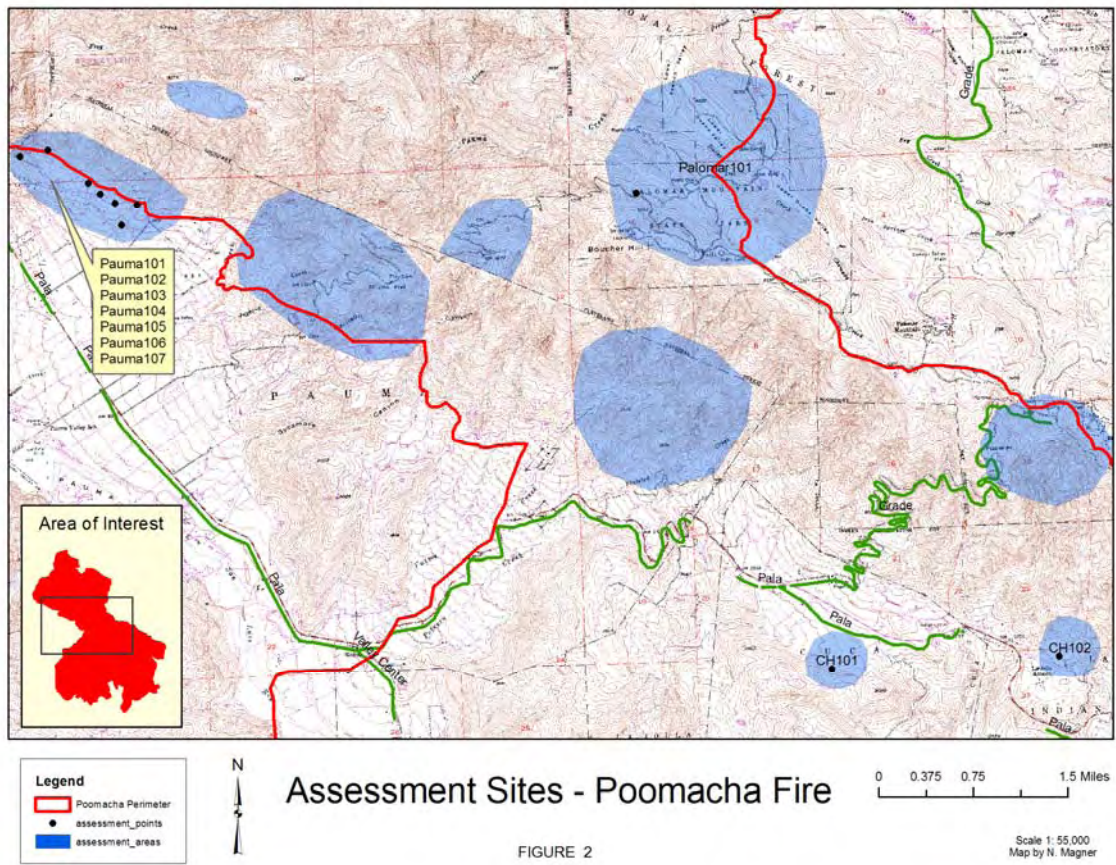


FIGURE 1



APPENDIX D FORESTRY COMMENT

Poomacha Notes from Jeff Calvert,
11-12-07, Team A, Palomar

Assessment of Forest Resources

County and State Parks need to remove any hazards due to burned trees. Additionally, along county roads, dead vegetation should be cleared in the future to reduce fuel for future fire suppression efforts. Less fuel will make it easier to hold fire lines if another fire comes toward Palomar from the south.

State Parks need to remove dead and dying vegetation on an ongoing basis to provide for safety on the public. Roads may need to be closed in times of extreme rainfall until exposed soil on slopes stabilizes.

There is some potential for damage to roads if heavy rains occur. Loose soil would be suspended in sheet flows then deposited on roads.

Suggest falling dead trees across steep slopes to help stabilize soils, reduce speed of water flow and provide microclimate for new seedlings.

SPECILIST REPORT

RESOURCES: BIOLOGICAL

BAER TEAM BIOLOGICAL RESOURCES REPORT

Resource Specialty: Biology

Fire Name: Poomacha

Month and Year: November 2007

Resource Team Lead: Nancy Frost, Associate Wildlife Biologist, California Department of Fish and Game

Resource Team Members: Magdalena Rodriguez and Jeff Brandt, Environmental Scientists, Meredith Osborne, Associate Botanist, and Maurice Cardenas, Associate Fishery Biologist

I. Potential Values at Risk

The focus of the Poomacha Fire burned area emergency rehabilitation (BAER) team was based on the following ranked values at risk: 1) human life and safety; 2) property; and 3) resources. A complete assessment of fire impacts/suppression activities or list of the sensitive species at risk is not the focus of this report; however, impacts to sensitive species are anticipated. This report assesses the effects of the Poomacha Fire and those proposed by the BAER for human life and property on non-federal and non-tribal land, to species that are state endangered (SE) and rare, federally threatened (FT), endangered (FE), and protected by the Bald and Golden Eagle Protection Act (BEPA) (Appendix 1). The aforementioned species with designation as state species of special concern (CSC) are also noted below:

Species	Status	Habitat
California Gnatcatcher (<i>Polioptila californica californica</i>)	FT/CSC	Coastal Sage Scrub
Nevin's Barberry (<i>Berberis nevinii</i>)	FE/SE	Coastal Sage Scrub, Chaparral
Golden Eagle (<i>Aquila chrysaetos</i>)	BEPA/CSC	Coastal Sage Scrub, Chaparral, Grassland
Arroyo toad (<i>Bufo californicus</i>)	FE/CSC	Riparian
Southwestern Willow Flycatcher (<i>Empidonax traillii extimus</i>)	FE/SE	Riparian Woodland
Laguna Mountain Skipper (<i>Pyrgus ruralis lagunae</i>)	FE	Pine Forests
Dunn's Mariposa Lily (<i>Calochortus dunnii</i>)	Rare	Montane Chaparral/Pine Forest
Large-blotched salamander (<i>Ensatina eschscholtzii klauberi</i>)	CSC	Forests, Coastal Sage Scrub, Chaparral

II. Resource Condition Assessment

A. Resource Setting

This fire started as a structure fire on the La Jolla Indian Reservation and spread through Pauma Valley to the lower slopes of Palomar Mountain, the northern slopes of Boucher Hill, and to lower Doane Valley (County of San Diego 2007). Habitats affected by the burn include chaparral (15,958 acres), coastal sage scrub (6,197 acres), oak woodlands/forests (9,148 acres), grassland (3,138 acres), conifer forest (11,503), riparian (823 acres), and other wetland (196 acres) (Appendix 2; County of San Diego 2007). Approximately 15,100 acres of the Poomacha Fire overlapped with the 2003 Paradise Fire burn area.

B. Findings of the On-The-Ground Survey

1. Biological Resource Condition Resulting from the Fire

Upland species

Coastal sage scrub and grassland generally burned at a low to moderate severity. Chaparral, oak woodlands/forests, and conifer forests burned at a low to high severity.

Riparian Habitats

The burn was of moderate to high intensity within riparian woodland/forests and other wetland habitats. The riparian habitat along the San Luis Rey River burned at moderate intensity with patches of high severity. In the San Luis Rey/Paradise Creek area, the primary concern is the moderate burn on north facing slopes that flow into the San Luis Rey River. Anticipated impacts include burn debris and sediment flowing to the San Luis Rey River. It is also likely that aquatic species will be affected by poor water quality resulting from mobilized debris and sediment. Due to extremely high burn severity within the upper watershed of Plasted and Cedar Creeks, it is likely that there will be highly mobilized ash and sediment. Possible effects to water quality could extend to other downstream riparian areas. In general, it is likely that the extent of these burn areas will have effects to downstream aquatic biota, as well as an increase in large woody debris throughout and beyond the burn areas.

2. Consequences of the Fire on Biological Values at Risk

Upland species

Coastal sage scrub and chaparral species

Coastal sage scrub is adapted to periodic fires, but disturbance from fires may facilitate infestation by non-native, invasive weeds (County of San Diego 2007). Increased fire frequency may convert coastal sage scrub habitat to grassland (Zedler et al. 1983) and reduce California gnatcatcher populations (Bontrager et al. 1995, Atwood et al. 1998).

Typically, California gnatcatcher populations recover from fire within several years, the time that it takes coastal sage scrub to regenerate post-fire; however,

the 2007 San Diego County census found extremely few California gnatcatcher territories had re-established after the 2003 Cedar Fire. The overlap of the Cedar and Poomacha Fires in the Guejito area in California gnatcatcher-occupied coastal sage scrub may have even longer-lasting effects on this species.

Buildup of high fuel loads in chaparral communities results in unnaturally hot fires that may kill plants and destroy the seed banks of some species. Nevin's barberry has been documented northeast of Palomar Mountain County Park. This species is a stump-sprouter after wildfires, but the effects of an altered fire regime on this species are unknown. Seed production is sporadic and fertility has been observed to be low.

Montane Chaparral/Conifer Forests

Dunn's mariposa lily, known to occur in the burned area on Palomar Mountain, sprouts from a bulb and occurs in dry stony ridges and fire breaks in chaparral and yellow pine forests. In the first post-fire growing season, the plant sprouts from the corm. Ground disturbance activities should try minimizing damage to bulbs that have survived the fire underground. Avoid ground disturbing activities in areas where the species is known to occur.

The Laguna Mountains skipper butterfly (*Pyrgus ruralis lagunae*) occupies an extremely restricted range within San Diego County, California and is found only on Mt. Palomar and in the Laguna Mountains. The skipper inhabits wet montane meadows at higher elevations, approximately 4,000 to 6,000 feet, within yellow pine forests.

The larvae of the skipper feed solely on Cleveland's horkelia (*Horkelia clevelandii*), a perennial plant in the rose family. Threats to the skipper include decreasing abundance of host plant due to cattle grazing, recreational activities, and development. Due to the very small population size and distribution, any disturbance to skipper habitat has large impacts on skipper populations.

According to the County of San Diego's 2007 assessment of impacts of the Poomacha Fire on the Laguna Mountain skipper, "Palomar Mountain (Lower French Valley) was not burned, although it was within the fire perimeter." However, if other, (possibly unmapped) occupied areas were burned, the fire may have resulted in direct mortality to skipper eggs or larvae. The host plant, which occupies open vegetation without much tree canopy, could possibly experience a post-fire benefit. However, the temporal loss of a food source during regeneration of the host plant could have a significant impact on the skipper populations in burned areas.

During post-fire remediation activities, soil disturbance, vehicle and foot traffic, and equipment staging areas should be avoided within sites occupied by the host plant. Follow-up surveys and monitoring of both the skipper and Cleveland's

horkelia should be conducted. Occupied and potential skipper habitat should be monitored for at least two years following the fire to determine whether weed control will be necessary.

The large-blotched salamander (*Ensatina eschscholtzii klauberi*) occupies evergreen and deciduous forests, oak woodland, chaparral, and coastal sage scrub from the San Jacinto Mountains in southern California to northern Baja California. The salamander is frequently found under rocks and rotting logs or bark. The salamander remains underground during the dry season and emerges when it rains in winter or spring. The species is fully terrestrial and does not require water to breed. Threats to the salamander include habitat degradation and fragmentation due to development, substrate disturbance, and clear cutting of habitat.

The Poomacha fire may have resulted in direct mortality to some of the large-blotched salamander population, but many individuals may have avoided the fire while underground. Large-scale removal of canopy by the fire will result in reduced shading of the salamander habitat for a number of years. Follow-up surveys and monitoring should be conducted.

Grassland species

While grassland habitat typically recovers after fires, weeds may invade where bulldozer lines disturbed the soil, causing a reduction in habitat value (County of San Diego 2007). The golden eagle is a grassland species that also occurs in coastal sage scrub and chaparral. This species has been documented near the southern boundary of the La Jolla Indian Reservation. The severity and the extent of the burn likely impacted rodent and rabbit populations upon which golden eagles prey. Golden eagles may rebound as small and medium-sized mammal populations recover.

The Wildlife Research Institute (Dave Bittner, personal communication, 2002) has been documenting the San Diego County population of golden eagles since 1987. Their research has determined that most San Diego eagle pairs have a home range territory of 20-30 square miles with a smaller, core nesting and foraging area; the San Diego population has declined by approximately 53 percent; and may be the most threatened population of golden eagles in North America. Research by the Wildlife Research Institute has shown that golden eagles are extremely sensitive to nest site disturbance by humans and will fly off the nest when humans approach within 1,500 feet of the nest.

Riparian Species

Southwestern willow flycatchers inhabit dense riparian tree and shrub communities associated with rivers, swamps, lakes, and reservoirs. This species breeds in southwestern North America and winters in Mexico, Central America, and northern South America. The largest population of the flycatcher in California (45 to 50 pairs) is found along an approximately four-mile stretch of the

San Luis Rey River directly west of Lake Henshaw (William E. Haas, personal communication, 2007). The Poomacha Fire did not reach the stretch of the San Luis Rey River occupied by the flycatcher colonies. Even post-fire impacts from siltation may be limited, with runoff from the fire being deposited downstream of the colonies (W.E. Haas, personal communication, 2007). The fire may result in an initial reduction in insect forage for this species. Follow-up surveys and monitoring are recommended. Occupied habitat may actually be becoming too dense to provide appropriate foraging areas (W.E. Haas, personal communication, 2007). The riparian vegetation along this stretch of the San Luis Rey River should be evaluated to determine if selected thinning would benefit the flycatcher.

Southwestern willow flycatchers are known to inhabit willow riparian in the San Luis Rey River approximately one mile upstream of the burn area. Because this willow riparian habitat is upstream of the burn, impacts to southwestern willow flycatchers are not anticipated.

The survivorship of riparian amphibian species including, arroyo toad, depended on the severity of the burn in the riparian drainages. Arroyo toads in Bee Canyon likely survived the fire but could be impacted by extensive sedimentation after the fire. To determine if overall impacts from the fire were positive for this species, which prefers open riparian areas (County of San Diego 2007), species monitoring should be done.

III. Emergency Determination

The fire burned a significant portion of the habitat identified as important in the proposed San Diego County North County Multiple Species Conservation Program (NCMSCP) plan. This plans aim for long-term protection of key sensitive and listed species, including most of those discussed in this report.

IV. Treatments to Mitigate the Emergency

A. Treatment Type

Methods of treatments for burn areas include:

- Implement BMPs upstream of sensitive riparian habitats to minimize sediment load.
- Conduct revegetation efforts where appropriate to promote native habitat recovery.
- Conduct post-fire surveys for wildlife species and habitats
- Conduct species monitoring to assess long-term population impacts from the fire.
- Coordinate with local agencies regarding maintenance activities to avoid, minimize, and mitigate additional species impacts.

B. Treatment Objective

The treatments objectives are to monitor wildlife populations and encourage adaptive management through the NCCP process.

C. Treatment Description

1. Erosion Control

- Stabilize slopes over 20 percent and less than 50 percent, where feasible, with biodegradable matting to limit slope erosion.
- Avoid use of hydroseed and hydromulch. Hydromulch and hydroseed are ineffective because of the lack of soil moisture for them to be efficient, they inhibit natural recruitment from the native seed bank, and they introduce exotic weed species into native habitat.
- Vegetation clearing should be limited to the smallest area feasible to accomplish activities safely.

2. Revegetation of Native Habitat

- Revegetate riparian habitats in burn areas where appropriate to encourage habitat regrowth. Riparian vegetation will provide soil stabilization and refugia for wildlife.
- Plant cactus scrub in burn areas of known cactus wren occurrences to promote faster restoration of habitat for the cactus wren.

3. Population surveys and long-term monitoring

- Conduct long-term seasonally appropriate surveys for California gnatcatcher and coastal cactus wren in the burn area to assess direct mortality and habitat loss.
- Conduct long-term seasonally appropriate small mammal surveys throughout the burn area because of high mortality rates anticipated from the fire.

4. Local agency Coordination

- Local agencies and jurisdictions should coordinate activities with the Wildlife Agencies to avoid, minimize, and mitigate impacts to sensitive species during post-fire recovery efforts.
- Coordinate local jurisdiction and private landowner activities within riparian areas and in listed and "covered species" habitat to address wetland permitting (e.g., Department of Fish and Game, Regional Water Quality Control Board, and U.S. Army Corps of Engineers) and California and federal endangered species issues.
- Recommend the above-mentioned government and non-government groups and federal BAER team mutually staff and participate on a Poomacha Fire recovery and remediation team, commencing with the ending of the BAER Team. This will facilitate coordination, timeliness, and environmental sensitivity of the projects that have been/will be proposed for the burned area's watershed.

IV. Site-Specific Recommendations

See Appendix 3 for the descriptions of the recommendation codes for impact remediation.

CA Geological Survey Burn Site Evaluation Summary (Fire: Poomacha, BAER 10, 11-11-07)

Notes: , PA=Pauma, Pal=Palomar, Cu=Cuca, CH=Church Rd., L=low, H=high, M=moderate, S=south, N=north, Rd=road

Site #	At-Risk Feature	Street Address	GPS location		Hazard	Pre-existing Habitat Lost	Risk to Resources	Potential future impacts to resources	Recommendations for remediation from impacts (BMP's)
			Lat (North)	Long(West)					
PA101	House		N33.34600	W117.00332	Debris flow/rock fall	Avocado, Oak riparian stream	Unknown	Erosion/debris flow	G, W, B, EC, S1
PA102	Trailer and Storage		N33.34661	W116.99944	Debris flow/rock fall	Chaparral, Oak scrub, Avocado	L	Erosion, debris/rock flow	G, W, B, EC, S1
PA103	Houses		N33.34264	W116.99406	Debris flow	Chaparral, Oak scrub, Avocado	L	Erosion, debris/rock flow, debris in stream	G, W, B, EC, S1
PA104	Culvert		N33.34136	W116.99245	Debris flow/torrent	Avocado farm	L	Erosion, debris stream in	G, W, B, EC, S1
PA105	Culvert		N33.34023	W116.99045	Debris flow	Ephemeral streambed	L	Erosion	G, W, B, EC, S1, S8, S52
PA106	Culvert		N33.33992	W116.98746	Debris flow	Ephemeral streambed	L	Erosion	G, W, B, EC, S1

PA107	Houses		N33.33764	W116.98967	Debris flow	Ephemeral streambed, cactus, Avocado farm	L	Erosion	G, W, B, EC, S1
-------	--------	--	-----------	------------	-------------	---	---	---------	-----------------

CA Geological Survey Burn Site Evaluation Summary (Fire: Poomacha, BAER 10, 11-11-07)

Notes: , PA=Pauma, Pal=Palomar, Cu=Cuca, CH=Church Rd., L=low, H=high, M=moderate, S=south, N=north, Rd=road

Site #	At-Risk Feature	Street Address	GPS location		Hazard	Pre-existing Habitat Lost	Risk to Resources	Potential future impacts to resources	Recommendations for remediation from impacts (BMP's)
			Lat (North)	Long(West)					
PA108	Stream		N33.80000	W116.97599	Tires in stream	Ephemeral streambed	M	Over one thousand tires in stream	G, S1, S8, S52
Pal101	Road		N33.33946	W116.41896	Mudslide	Pine Cedar Forest	L	Water quality, road washout	G, P, W

CU101	House		N33.2847	W116.8942	Land Slide	Oak grassland	L	Erosion	G, B, W
CH102	House		N33.2849	W116.8630	Debris Flow, culvert blockage	Oak woodland on slopes	M	Erosion, water quality,	G, B, W,

VI. References

Atwood, J.L. 1998. Analysis of edge effects on California gnatcatcher reproductive success. Prepared for the City of Rancho Palos Verdes.

Bontrager, D.R., A.L. Gorospe, and D.K. Kamada. 1995. 1995 breeding biology of the California Gnatcatcher in the San Joaquin Hills, Orange County, California. The Superpark Project. Laguna Beach.

County of San Diego. Vegetation and Conserved Lands Affected by the Witch Creek, Harris, and Poomacha Fires, October 2007. 20 pages.

Department of Fish and Game Sensitive Species, <http://www.dfg.ca.gov/wildlife/species/>

Department of Fish and Game Biogeographic Information and Observation System, <http://bios.dfg.ca.gov/>

Department of Fish and Game California Natural Diversity Database, [http://mercury.ornl.gov/metadata/nbii/html/ceic/gis.ca.gov_catalog_ceic_export_online_CANaturalDiversityDatabaseCNDDDB\(4137\).html](http://mercury.ornl.gov/metadata/nbii/html/ceic/gis.ca.gov_catalog_ceic_export_online_CANaturalDiversityDatabaseCNDDDB(4137).html)

VI. Appendices

Appendix 1 – California Natural Diversity Database Map

Appendix 2 – Poomacha Fire Vegetation Impacts (from County of San Diego 2007)


Appendix 3 – Recommendations

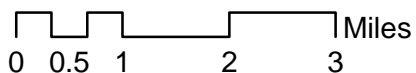
San Diego County Poomacha Fire & CNDDDB T & E Species

 S_CA_Fire_Perims_Merged_20071103_AM2_ta83

California Natural Diversity Database

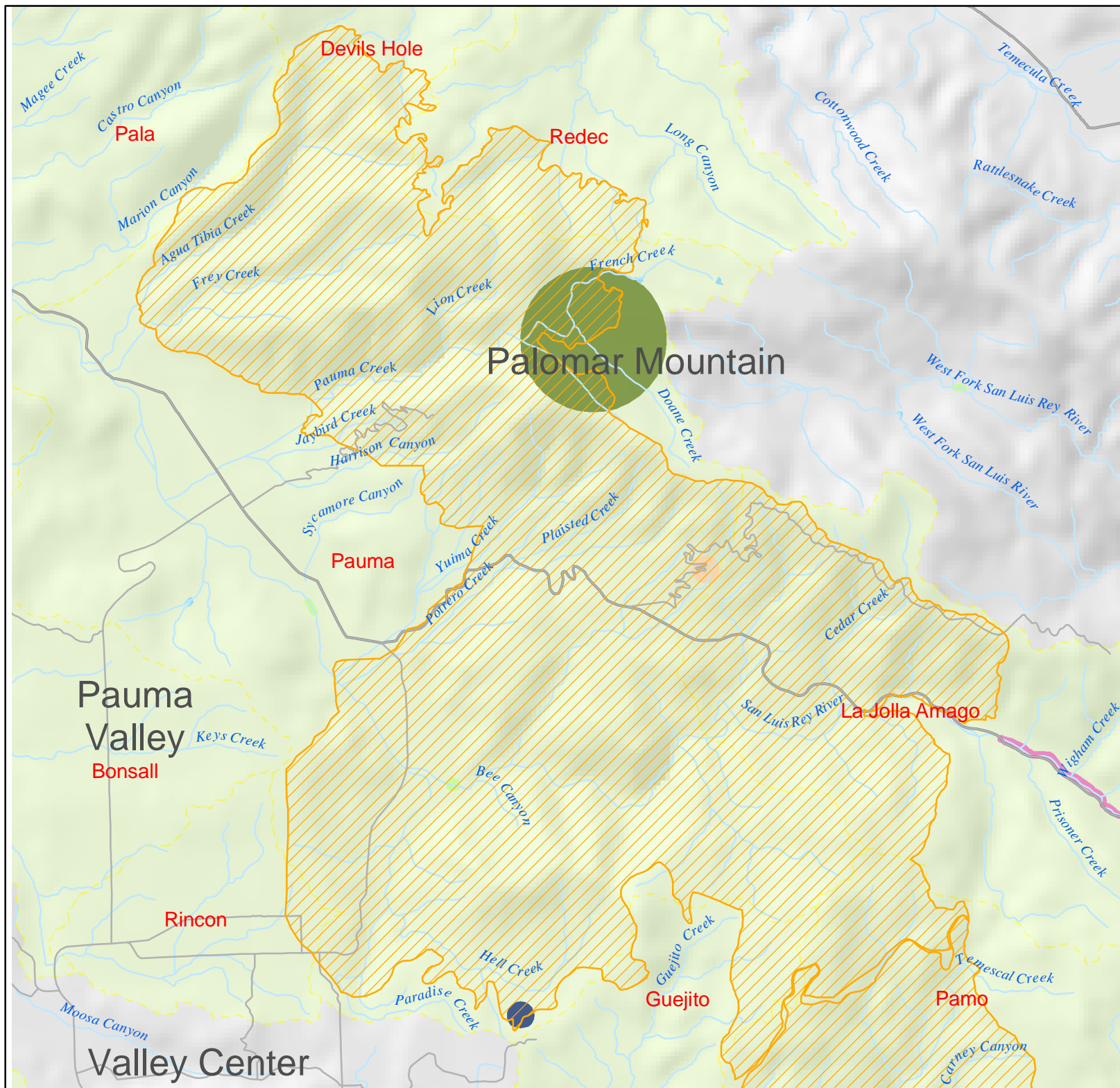
Species / Listing(s)

-  Arroyo toad / FE
-  Bank swallow / ST
-  Belding's savannah sparrow / SE
-  Coastal California gnatcatcher / FT
-  Dehesa nolina / SE
-  Dunn's mariposa lily / SR
-  Encinitas baccharis / FT, SE
-  Gander's ragwort / SR
-  Least bell's vireo / SE, FE
-  Mexican flannelbush / FE, SR
-  Nevin's barberry / FE, SE
-  Orcutt's spineflower / FE, SE
-  Olay Mesa mint / FE, SE
-  Olay tarplant / FT, SE
-  San Diego ambrosia / FE
-  San Diego button-celery FE, SE
-  San Diego fairy shrimp / FE
-  San Diego thorn-mint / FT, SE
-  Southwestern willow flycatcher / SE
-  Stephens' kangaroo rat / ST, FE
-  Swainson's hawk / ST
-  Thread-leaved brodiaea / FT, SE
-  Tidewater goby / FE
-  Quino checkerspot butterfly / FE
-  Watersheds (Calwater 2.2.1 - HSNAME Planning Unit)



SanDiego_2007Wildfire_Watersheds_Poomacha.mxd

Map prepared by CDFG's South Coast Region GIS
(K. DeVore, 11/2007)

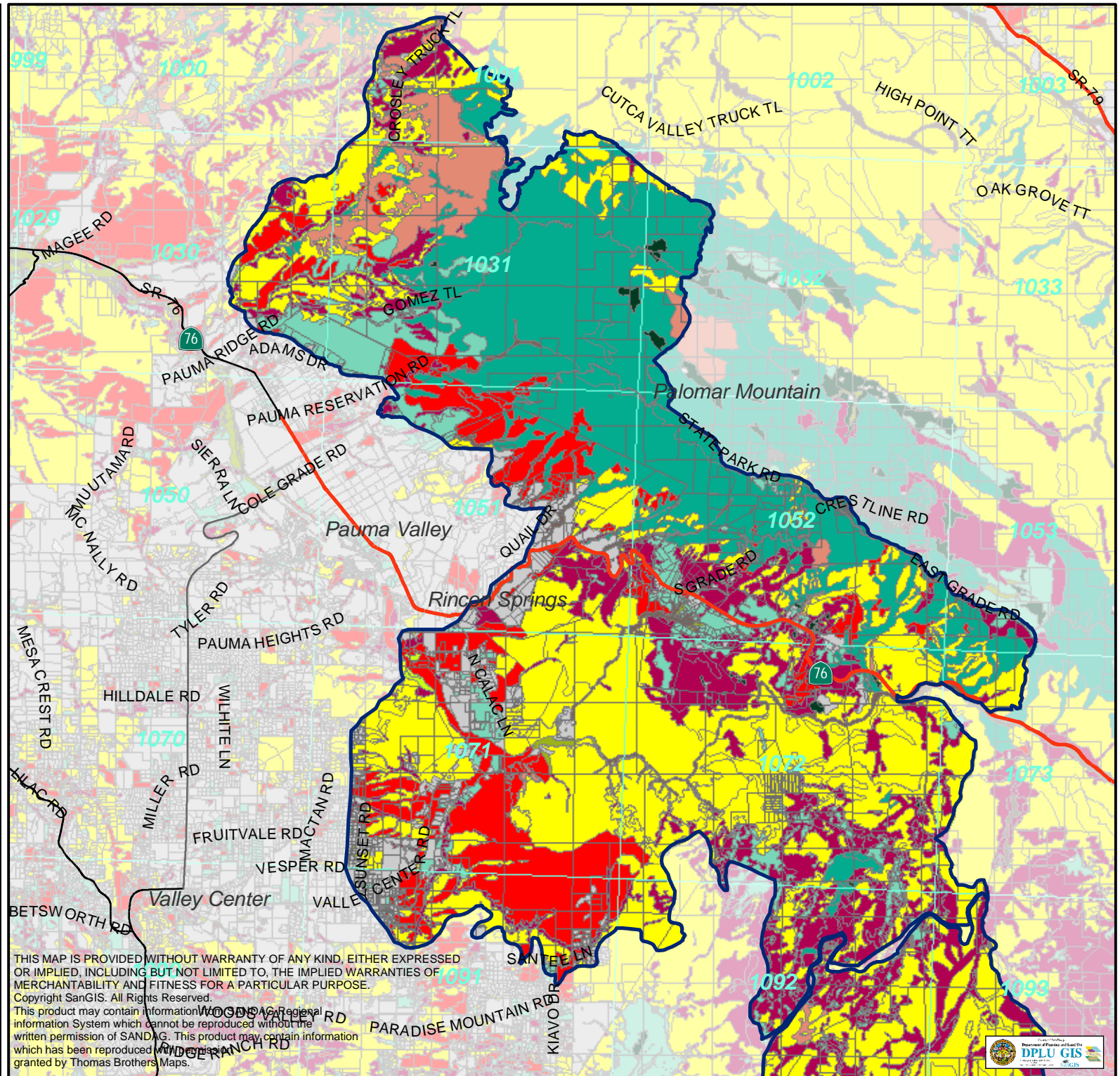
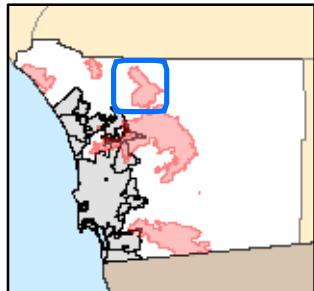


VEGETATION IMPACTS INCIDENT CA-MVU-010634 POOMACHA FIRE 10/31/2007 0600

- Fire Perimeter (071031)
- Vegetation Communities (Holland 95 Classification)**
- HOLLAND**
- Southern Foredunes, Beach, Saltpan, Mudflats
- Coastal Sage Scrub
- Chaparral
- Grassland
- Riparian Scrub
- Riparian Woodland
- Riparian Forest
- Pinyon Juniper Woodlands
- Other Woodlands
- Oak Forest
- Meadow and Seep
- Marsh
- Coniferous Forest
- Desert Dunes (22100, 22300)
- Playas/Badlands/Mudhill Forbs
- Desert Scrub
- Desert Chaparral
- Dry Wash Woodla
- Water (Including 11200, 13200)
- Urban, Disturbed Habitat, Agriculture, Eucalyptus Woodland
- Not Mapped (data gaps)
- Parcels
- Thomas Bros. Grid Page
- Highway



Miles
0 0.35 0.7 1.4 2.1 2.8



THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
Copyright SanGIS. All Rights Reserved.
This product may contain information from SANDAG's Regional Information System which cannot be reproduced without the written permission of SANDAG. This product may contain information which has been reproduced with permission from the copyright owner, granted by Thomas Brothers Maps.

APPENDIX 3

Poomacha Post Fire Recommendations, Measures and Best management Practices *(Note some measures are repeated in the different categories)*

Categories

- General (Code: G applies to all projects)
- Wildlife (Code: W)
- Birds (Codes: B, and species)
- Plants (Codes: P, and species)
- Fisheries and Herptiles (Code: F, and species)
- Invertebrates (Species specific)
- Erosion Control General (Code: EC)
- Equipment, Maintenance, Pollution, Litter, and Education (Code: EMP)
- Wetlands CDFG Jurisdictional (Code: Wet)
- Streams and associated habitats (Code: S and associated #)

General—applies to all projects

A qualified biologist (wildlife/botanist) should be present on site for the duration of the project to monitor activities and ensure all practicable measures are being employed to minimize impacts when working in areas with listed plants and animals.

Resource monitoring is recommended in all areas with listed and/or sensitive species to examine the natural rehabilitation.

Construction activities should avoid impacts to any existing stands of unburned native resources in a burned area (e.g. shrubs). Such habitat should be adequately marked.

Removal of native vegetation should be avoided and minimized. Temporary impacts should be returned to pre-existing contours and re-vegetated as appropriate.

Construction footprint should be minimized to maximum extent feasible. Access to sites should be via pre-existing access routes to greatest extent possible.

Oak slash should be left in place if possible/feasible.

Some burned standing trees should remain to provide habitat for cavity nesting bird species.

Conservation of seed bank is critical to survival of many special status plant species.

If any wildlife is encountered during the course of construction, the wildlife shall be allowed to leave the construction/project area unharmed and should be flushed, hazed, or herded in a safe direction away from the project sites or roadways.

The Operator shall ensure that development lighting adjacent to all on- or off-site habitat will be directed away from and/or shielded so as not to illuminate native habitats.

If night work is necessary, night lighting shall be of the lowest illumination necessary for human safety, selectively placed, and shielded and directed away from natural habitats.

Wildlife (Code: W)

If any wildlife is encountered during the course of construction, the wildlife shall be allowed to leave the construction/project area unharmed and should be flushed, hazed, or herded in a safe direction away from the project sites or roadways.

Exotic species that prey upon or displace listed or species of concern should be permanently removed from sites.

Where appropriate based on site-specific survey results, wildlife undercrossings shall be designed and implemented for new roads or road improvement projects that could disrupt wildlife movements or result in increased road kill. Such undercrossings, along with any necessary wildlife fencing or other facilities, shall be designed based on best available information to maximize use of the undercrossing by species of concern. Undercrossing design shall strive to maximize the openness index ($[\text{width} \times \text{height}] / \text{length}$), minimize traffic noise within the crossing, use appropriate fencing to funnel wildlife into the crossing rather than across the road surface, and screen the undercrossing openings with natural vegetation.

To minimize impacts on **bats**, work at a bridge site should be surveyed for bats by a qualified biologist. If bats are found to be present, avoid working on the bridge from March 1 through October. Ensure that roosting areas remain intact for future use and nearby water sources remain available. If the bridge needs to be replaced, it should be removed prior to March 1. The new bridge should be designed to include roosting habitat within the structure.

Where appropriate conduct long-term seasonally appropriate bird surveys for Coastal California gnatcatcher, coastal cactus wren, and Southern California rufous crowned sparrow throughout the burn area because of increased direct mortality and loss of habitat.

Where appropriate conduct long-term seasonally appropriate small mammal surveys throughout the burn area because of high mortality rates anticipated from the fire.

Where appropriate monitor mountain lion, deer, and mesopredator populations and movement patterns to monitor population size and health.

Birds--General (Code: B)

Migratory nongame native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918(50 C.F.R. Section 10.13). Sections 3503, 3503.5 and 3513 of the California Fish and Game Code prohibit take of all birds

and their active nests including raptors and other migratory nongame birds (as listed under the Federal MBTA).

To minimize impacts on nesting birds on site or in the vicinity during construction, construction (including disturbances to native and non-native vegetation, structures and substrates) should occur outside of the bird breeding season (March 1-August 31). If construction is proposed during the breeding season, a qualified biologist should conduct a pre construction survey of the project site and surrounding habitat to determine whether there are active nests within the area. If an active nest is observed, we recommend that a buffer be established (with flagging and stakes) between the construction activities and the nest so that nesting activities are not interrupted. The buffer should be a minimum width of 300 feet and should be in effect as long as construction is occurring and until the nest is no longer active.

To minimize impacts on nesting raptors (birds of prey) on site or in the vicinity during construction, construction (including disturbances to native and non-native vegetation, structures and substrates) should occur outside of the bird breeding season (February 1 - August 30 or July 31 for *Buteo* spp.) a qualified biologist should conduct a pre-construction survey of the project site and surrounding habitat during breeding season to determine whether there are active raptor nests within that area. If an active nest is observed, we recommend that a buffer be established between the construction activities and the nest so that nesting activities are not interrupted. The buffer should be a minimum width of 300 feet and should be in effect as long as construction is occurring and until the nest is no longer active.

Birds--Species specific

California gnatcatcher

Habitat: coastal sage scrub

Recommendations: Monitor post burn to assess if coastal sage scrub is converted to less desirable forms of sage scrub or non-native grasslands, that are not suitable for nesting.

-Complete invasive vegetation removal before February 15 or after August 30 to prevent effects to nesting avian species.

Golden eagle

Habitat: Nesting in lightly forested areas or in forests, and foraging in coastal sage scrub, chaparral, and grasslands. Post Fire concerns: Forage habitat in burn areas is likely to be reduced temporally in quality for prey species, and nest abandonment due to disturbance by hikers or recreation use.

Recommendations:

1. Maintain a minimal 4,000 foot disturbance avoidance radius around any current or historically active nesting location to minimize impacts on nesting raptors.
2. Avoid using poison for ground squirrels and other wildlife, or other pesticides, within a minimal 4,000 foot disturbance avoidance radius around any current or historically active nesting locations.

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

Habitat consists of dense riparian tree and shrub communities associated with rivers, swamps, lakes, and reservoirs. Breeds in Southwestern North America; winters in Mexico, Central America, and northern South America. The largest population of the flycatcher in California (45-50 pairs) is found along an approximately 4 mile stretch of the San Luis Rey River directly west of Lake Henshaw (William E. Haas, personal communication, 11/14/07). It migrates south after breeding in southern North America. Threats to the species include extensive loss and modification of breeding habitat. The Poomacha fire did not reach the stretch of the San Luis Rey River occupied by the flycatcher colonies. Even impacts from siltation may be limited, with runoff from the fire occurring downstream of the colonies. (W.E. Haas, personal communication 11/14/07). The fire may result in an initial reduction in insect forage for this species. Recommendations include conducting follow-up surveys and monitoring. Occupied habitat may actually be becoming too dense to provide appropriate foraging areas (W.E. Haas, personal communication 11/14/07). The riparian vegetation along this stretch of the San Luis Rey River should be evaluated to determine if selected thinning would benefit the flycatcher.

Fisheries and Herptiles--General (Code: F)

Recommendations - The extent and severity of the fire on coastal streams within San Diego County will likely produce an increase in sediment transport and erosion this coming winter. It is likely that there will be an increase in the amount of sediment and debris from previous years. To minimize the streams effects on fishes and herptiles by this years fire, any affected stream should be evaluated when it has been determined that T and E fishes and herptiles have been recently documented within that given stream. With the support of a qualified biologist familiar with local streams, an assessment will be made in the field to determine a best management plan for that stream. The use of hay bails has the benefit of ease of transport, site placement and perhaps more importantly the filtering of ash material. Access and placement need to be taken into account.

Fisheries and Herptiles--Species specific**Arroyo Toad**

Habitat: riparian habitats with sandy streambeds with riparian areas for breeding. Adults disperse from breeding habitat up to a kilometer (0.6 mile) to forage and up to 2 kilometer to aestivate in adjacent upland habitats in Coastal Sage Scrub and Chaparral. The toad is chiefly nocturnal; breeding season—eggs are laid from March to July-- Summer stream flow or the persistence of shallow breeding pools until at least July is essential. Tadpoles develop over an extended period of 65-85 days. The lengthy larval period makes them extremely susceptible to mortality during this time. Primary concerns— the natural fluvial processes that create and maintain toad breeding habitat have been disrupted by altered streamflows and watershed degradation. The remaining breeding habitats in the area have been infested with detrimental exotic species that are difficult to control. Introduced predators include bullfrogs and freshwater game fish.

Post Fire concerns: Forage and breeding habitat in burn areas is likely to be significantly reduced in quality until debris/sediment flows are normalized. Shallow breeding pools may be inundated with sediment/silt. Marginal quality habitat becomes more important due to habitat loss.

Recommendations:

1. Avoid impacts to habitats during breeding season from March through July.
2. Avoid habitat with a minimum 300 to 500 foot buffer area.
3. Preserve and enhance existing habitats.
4. Avoid night driving adjacent to habitats.
5. Educate public on nocturnal habits of species.
6. Remove exotic species/introduced predators such as bullfrogs and freshwater game fish from habitats.
7. Monitoring and reporting in burn areas and adjacent habitats.

Large-blotched salamander

The large-blotched salamander (*Ensatina eschscholtzii klauberi*) occupies evergreen and deciduous forests, oak woodland, chaparral, coastal sage scrub from the San Jacinto Mountains in Southern California to northern Baja California. The Poomacha fire may have resulted in direct mortality to some of the large-blotched salamander population, but many individuals may have avoided the fire while underground. Large-scale removal of canopy by the fire will result in reduced shading of the salamander habitat for a number of years.

Invertebrates—Species specific

The Laguna Mountains skipper butterfly (*Pyrgus ruralis lagunae*) occupies an extremely restricted range within San Diego County, California and is found only on Mt. Palomar and in the Laguna Mountains. The skipper inhabits wet montane meadows at higher elevations, approximately 4,000 to 6,000 feet, within yellow pine forests.

Due to the very small population size and distribution, any disturbance to skipper habitat has large impacts on skipper populations. The host plant, which occupies open vegetation without much tree canopy, could possibly experience a post-fire benefit. During post-fire remediation activities, soil disturbance, vehicle and foot traffic, and equipment staging areas should be avoided within sites occupied by the host plant.

Plants—General (Code: P)

Conservation of seed bank is critical to survival of many special status plant species, especially this year because rainfall has largely not been sufficient to date to trigger germination, so most rare annuals currently exist only as seed in the soil. Impacts to the current year's seed production, held in any above-ground biomass that was burned, likely occurred. Some heat kill of seed bank is possible, especially where excess thatch or unusually large amounts of ground fuel occur. Typically we find most rare annuals and geophytes recover from wildfires over a period of several years if further disturbance to the burned areas of interest is controlled and minimized.

In addition to conservation of seed bank for special status plant species, please use RAREFIND; BIOS; or other GIS-based information on reported occurrences to assist in developing recommendation for Impact Avoidance and Minimization. (Please note: RAREFIND has a backlog of records that have not been entered that may go back several years)

Avoid mulching in areas with listed annuals as it may inhibit seed germination. Mulching might be acceptable in areas with listed shrubs or perennials but this depends on the specific species in question (see species specific recommendations).

Avoid any ground disturbing activity such as grubbing, contour tilling, scarification, driving heavy equipment, or other activities that would result in soil compaction or soil disturbance in areas mapped with listed plant species.

In areas with mapped listed plant species, avoid placement of wattles or other erosion control treatments directly on top of listed plant species with intact root crowns.

All straw and mulches should be seed free and should not contain species on the California Invasive Plant Council list (see site at <http://www.cal-ipc.org>).

Department promotes natural recovery without seeding except in situations where 1) risk to downstream property and life adjacent to impacted land is too great, and 2) probability of reducing erosion is high. Seeding is appropriate only if the following criteria are met: there is clear, scientific evidence that a given seeding mix will more effectively establish ground cover than the remaining, viable seeds in the natural seedbank, and 2), seeding has been demonstrated to be an effective restoration technique in relation to that specific incident's conditions (i.e. slope, soil-type, soil and duff damage, etc.). The Department believes that seeding may be appropriate in areas where fire suppression activity has removed or destroyed the natural seedbank (i.e. bulldozing). The Department acknowledges that when human safety is an issue downstream and seeding would protect human safety by better stabilizing an area, seeding is appropriate.

If seeding is carried out a basic seed mix should include the dominant species on-site pre-disturbance. Eight species are recommended in a mix. Annual or perennial ryegrass for erosion control is not recommended.

Do not stage construction activities in areas mapped with listed plant species.

Conduct re-vegetation efforts, where appropriate, to promote more rapid recovery of native habitats

Any planting stock to be brought onto the site for landscaping or ecological restoration shall first be inspected by a qualified pest inspector to ensure it is free of pest species that could invade natural areas, including but not limited to Argentine ants, fire ants, and other insect pests. Any planting stock found to be infested with such pests shall not be

allowed on the project site or within 300 feet of natural habitats. The stock shall be quarantined, treated, or disposed of according to best management principles by qualified experts in a manner that precludes invasions into natural habitats.

Invasive exotic plant species should not be planted, seeded or otherwise introduced. Exotic plant species not to be used include those species listed on Lists A & B of the California Invasive Plant Council's list of "Exotic Pest Plants of Greatest Ecological Concern in California as of October 1999." This list includes such species as: pepper trees, pampas grass, fountain grass, ice plant, myoporum, black locust, capeweed, tree of heaven, periwinkle, sweet alyssum, English ivy, French broom, Scotch broom, and Spanish broom. A copy of the complete list can be obtained by contacting the California Invasive Plant Council at 1442-A Walnut St. #462, Berkeley, CA 94709, or by accessing their web site at <http://www.cal-ipc.org>

Plants—Species specific

Dunn's Mariposa Lily (bulb)

Habitat: Rocky openings in chaparral or grassland/chaparral b/w 1500-1700 m

Soils: Restricted to metavolcanic and gabbroic derived soils.

Recommendations: Avoid use of non-native seed mixture. Avoid mulching or placement of erosion control devices directly on top of in mapped Dunn's Mariposa lily sites. Avoid soil disturbance or compaction of soils in known sites during construction.

Nevin's barberry

Habitat: Chaparral and washes at <650m

Soils: Sandy to gravelly soils

Recommendations: Avoid use of non-native seed mixture; if area reseeded keep habitat type as open chaparral.

General Erosion Control (Code: EC)

(also see Erosion under Streams and associated habitats below)

Silt fences should be removed when no longer necessary or, alternatively, they need to be made of biodegradable materials. Fencing should be installed in a manner that does not impact habitats to be avoided.

Any temporary structure should be removed when it is no longer needed.

Erosion control fabric or blankets should not be comprised of inorganic materials.

Avoid mulching in areas with listed annuals as it may inhibit seed germination. Mulching might be acceptable in areas with listed shrubs or perennials but this depends on the specific species in question (see species specific recommendations).

Avoid any ground disturbing activity such as grubbing, contour tilling, scarification, driving heavy equipment, or other activities that would result in soil compaction or soil disturbance in areas mapped with listed plant species.

In areas with mapped listed plant species, avoid placement of wattles or other erosion control treatments directly on top of listed plant species with intact root crowns.

All straw and mulches should be seed free and should not contain species on the California Invasive Plant Council list (see site at <http://www.cal-ipc.org>).

Department promotes natural recovery without seeding except in situations where 1) risk to downstream property and life adjacent to impacted land is too great, and 2) probability of reducing erosion is high. Seeding is appropriate only if the following criteria are met: there is clear, scientific evidence that a given seeding mix will more effectively establish ground cover than the remaining, viable seeds in the natural seedbank, and 2), seeding has been demonstrated to be an effective restoration technique in relation to that specific incident's conditions (i.e. slope, soil-type, soil and duff damage, etc.). The Department believes that seeding may be appropriate in areas where fire suppression activity has removed or destroyed the natural seedbank (i.e. bulldozing). The Department acknowledges that when human safety is an issue downstream and seeding would protect human safety by better stabilizing an area, seeding is appropriate.

If seeding is carried out a basic seed mix should include the dominant species on-site pre-disturbance. Eight species are recommended in a mix. Annual or perennial ryegrass for erosion control is not recommended.

Do not stage construction activities in areas mapped with listed plant species.

Any planting stock to be brought onto the site for landscaping or ecological restoration shall first be inspected by a qualified pest inspector to ensure it is free of pest species that could invade natural areas, including but not limited to Argentine ants, fire ants, and other insect pests. Any planting stock found to be infested with such pests shall not be allowed on the project site or within 300 feet of natural habitats. The stock shall be quarantined, treated, or disposed of according to best management principles by qualified experts in a manner that precludes invasions into natural habitats.

Invasive exotic plant species should not be planted, seeded or otherwise introduced. Exotic plant species not to be used include those species listed on Lists A & B of the California Invasive Plant Council's list of "Exotic Pest Plants of Greatest Ecological Concern in California as of October 1999." This list includes such species as: pepper trees, pampas grass, fountain grass, ice plant, myoporum, black locust, capeweed, tree of heaven, periwinkle, sweet alyssum, English ivy, French broom, Scotch broom, and Spanish broom. A copy of the complete list can be obtained by contacting the California Invasive Plant Council at 1442-A Walnut St. #462, Berkeley, CA 94709, or by accessing their web site at <http://www.cal-ipc.org>

Equipment Use, Maintenance, Pollution and Litter, Education (Code: EMP)
(also see Pollution, Sedimentation, Litter under Streams and associated habitats below)

A qualified biologist shall conduct a training session for all project personnel prior to proposed activities. At a minimum, the training shall include a description of the target species of concern and its habitats, the general provisions of the Endangered Species Acts, the general measures that are being implemented to conserve the target species of concern as they relate to the project, and the access routes to and project site boundaries within which the project activities must be accomplished.

Do not stage construction activities in areas mapped with listed plant species.

Construction equipment and vehicles should be checked and maintained daily in order to prevent leaks of materials.

Spills need to be prevented when fueling vehicles or transferring fluids from one container to another. Use drip pans under spigots, valves and pumps to catch leaks and spills. The clean-up of all spills shall begin immediately upon observation of the spill.

Equipment maintenance should not be done within or near any stream channel or other sensitive resource site as petroleum products or other pollutants from the equipment may enter these areas under flow conditions.

Work sites should be protected from erosion.

Comply with all litter and pollution laws. All contractors, subcontractors and employees shall also obey these laws and it shall be the responsibility of the Applicant to ensure compliance. Retrieve any construction debris and litter on a daily basis from the project site. Utilize fully covered trash receptacles with secure lids (wildlife proof) to contain all food, food scrapes, food wrappers, beverage and other miscellaneous trash.

Do not permit pets on or adjacent to the construction site.

No debris, soil, silt, sand, bark, slash, sawdust, rubbish, construction waste, cement or concrete or washings thereof, asphalt, paint, oil or other petroleum products, or any other substances/materials associated with any project-related activity should be allowed to contaminate the soil and/or enter into or be placed where they may be washed by rainfall or runoff into a stream or lake. Any of these substances/materials, placed within or where they may enter a stream or lake, either by the Applicant or any party working under contract, shall be removed immediately upon observation of their presence.

Access to the work site shall be via existing roads and access ramps.

The equipment and vehicles shall be clean and free of any weed seeds.

Wetlands--CDFG Jurisdictional General (Code: Wet)

A water pollution and erosion control plan shall be developed that describes sediment and hazardous materials control, dewatering or diversion structures, fueling and equipment management practices, and other factors deemed necessary by reviewing agencies. Erosion control measures shall be monitored on a regularly scheduled basis, particularly during times of heavy rainfall. Corrective measures will be implemented in the event erosion control strategies are inadequate. Sediment/erosion control measures will be continued at the project site until such time as the revegetation efforts are successful at soil stabilization.

The upstream and downstream limits of projects disturbance plus lateral limits of disturbance on either side of the stream shall be clearly defined and marked in the field and reviewed by the biologist prior to initiation of work.

Projects should be designed to avoid the placement of equipment and personnel within the stream channel or on sand and gravel bars, banks, and adjacent upland habitats used by target species of concern.

When stream flows must be diverted, the diversions shall be conducted using sandbags or other methods requiring minimal instream impacts. Silt fencing or other sediment trapping materials shall be installed at the downstream end of construction activity to minimize the transport of sediments off-site. Settling ponds where sediment is collected shall be cleaned out in a manner that prevents the sediment from re-entering the stream. Care shall be exercised when removing silt fences, as feasible, to prevent debris or sediment from returning to the stream.

Equipment storage, fueling, and staging areas shall be located on upland sites with minimal risks of direct drainage into riparian areas or other sensitive habitats. These designated areas shall be located in such a manner as to prevent any runoff from entering sensitive habitat. All necessary precautions shall be taken to prevent the release of cement or other toxic substances into surface waters. All project related spills of hazardous materials shall be reported to appropriate and shall be cleaned up immediately and contaminated soils removed to approved disposal areas.

Avoid heli-mulching when in the vicinity of streams or channels.

Trash racks above culverts should be maintained.

Streams and associated habitats (Code: S and associated #)
(The following are standard DFG Code Section 1600 Streambed Alteration Agreement Measures)

Vegetation Clearing:

1. Work areas shall be limited to the smallest area feasible to accomplish the activity safely.
2. Work activities requiring the removal of intact habitat shall clear vegetation from

disturbed areas towards intact habitat to allow wildlife to escape into undisturbed areas.

3. In areas of temporary disturbance, with intact native vegetation having DBHs of 3 inches or less, the vegetation shall be cut to ground level with hand operated power tools rather than by grading.
4. Vegetation removed from the stream shall not be stockpiled in the stream bed or on its bank.
5. Vegetation removed from the stream shall not be stockpiled in the stream bed or on its bank. The sites selected on which to push this material out of the stream should be selected based upon least damaging impacts to resources including sensitive uplands resources. Downed woody debris can be retained on upland slopes to hold soils.
6. No living native vegetation shall be removed from the channel, bed, or banks of the stream, except as otherwise provided for in the Notification.
7. If work in a stream/lake is anticipated, the work area shall be flagged to identify its limits within the stream. Vegetation shall not be removed or intentionally damaged beyond these limits.
8. In areas infested with giant reed (*Arundo donax*), salt cedar (*Tamarix spp.*), or other exotic, invasive plant, or non-native plant species, the non-native plants shall be either removed or treated.

Species Protection:

9. The Operator shall not remove or otherwise disturb vegetation from March 1 to August 15 to avoid impacts to breeding/nesting birds; if disturbance must occur, then consult with the Department.

Be advised, migratory nongame native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918(50 C.F.R. Section 10.13). Sections 3503, 3503.5 and 3513 of the California Fish and Game Code prohibit take of all birds and their active nests including raptors and other migratory nongame birds (as listed under the Federal MBTA).

10. Prior to any construction during the raptor-nesting season, February 1 to September 1, a qualified biologist shall conduct a site survey for active nests prior to any scheduled activities. If an active nest is located, then consult with the Department.
11. In areas of intact habitat and known occurrences, the Operator shall have a qualified wildlife biologist or botanist survey the area to confirm the presence/absence of threatened, endangered, and/or other species of concern likely to be found in the area during the proposed operations. If evidence exist that listed species are present or likely to be present, consultation with the Department shall occur prior to disturbance

activities. The Operator shall be responsible for reporting all observations of threatened/endangered species or of species of special concern to the Departments Natural Diversity Data Base within ten (10) days of sighting.

12. In areas of intact habitat, a qualified biological monitor with all required collection permits shall be on site during operations and shall survey for species prior to activities. If any life stages of any native vertebrate species are found in the path of construction, the monitor shall relocate the species to a safe location. Exclusionary devices shall be erected to prevent the migration into or the return of species into the work site.

13. Place and monitor cowbird traps to minimize cowbird nest parasitism on sensitive bird species.

14. Pump intakes placed in stream/lake water shall be fitted with (1/8) inch or smaller mesh screens for January 1, through March 30, and (1/4) inch or small mesh screens thereafter.

15. If flowing or ponded water is within the proposed work limits, the Operator shall telephone the fishery biologist, Maurice Cardenas at (805) 640-1852, five days prior to commencing activities within the bed, bank, and channel. The Operator shall leave his/her name, date and time called, telephone number, the stream name, county/city, work location, nature of planned activities and proposed schedule.

16. The Operator shall install and use fully covered trash receptacles with secure lids (wildlife proof) to contain all food, food scrapes, food wrappers, beverage and other miscellaneous trash.

17. The Operator shall not permit pets on or adjacent to the construction site.

18. The Operator shall ensure that no guns/or other weapons are on-site during activities, with the exception of the security personnel. No hunting shall be authorized/permitted during activities.

Erosion Control:

19. Projects shall revegetate and stabilize areas of disturbed soils with slopes toward a stream or lake to reduce erosion potential. Stripped or exposed work areas within the banks, bed, and channel of the stream (including construction areas, temporary spoil pile, access roads, or other adjacent uplands work areas, etc.) with native vegetation local to the area by reseeding, planting, hydro-mulch. Where suitable vegetation cannot reasonably be expected to become established, non-erodible materials, such as coconut fiber matting, shall be used for such stabilization. Any installation of non-erodible materials not described in the original project description shall be coordinated with the Department.

20. To provide protection from erosion, the Operator may plant willow cuttings (obtained from nearby plants) on 6 ft centers, on the slope and in the streambed of the restored area. Plantings and/or cuttings may require irrigation, when natural moisture is

insufficient to sustain growth, for an interval of two years.

21. All planting should be done after the first wetting rains between October 1 and February 1 to take advantage of the winter rainy season, dormancy of foliage, and rooting period to ensure optimum survival of plantings. Should the Operator be required to plant during other times of the year, chances of survival are diminished. The Operator shall provide irrigation when natural moisture conditions are inadequate to ensure survival of plants.

22. Any materials placed in seasonally dry portions of a stream or lake that could be washed downstream or could be deleterious to aquatic life shall be removed from the project site prior to inundation by high flows.

23. Erosion control shall include the revegetation of stripped or exposed work areas with vegetation native to the area.

24. Restoration shall include the revegetation of stripped or exposed habitat or mitigation areas with vegetation native to the area.

25. If work in a stream/lake is anticipated, the work area shall be flagged to identify its limits within the stream. Vegetation shall not be removed or intentionally damaged beyond these limits.

Pollution, Sedimentation, and Litter:

26. No debris, soil, silt, sand, bark, slash, sawdust, rubbish, construction waste, cement or concrete or washings thereof, asphalt, paint, oil or other petroleum products or any other substances which could be hazardous to aquatic life, or other organic or earthen material from any logging, construction, or other associated project related activity shall be allowed to contaminate the soil and/or enter into or placed where it may be washed by rainfall or runoff into, waters of the State. Any of these materials, placed within or where they may enter a stream or lake, by the Operator or any party working under contract, or with the permission of the Operator, shall be removed immediately. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream or lake.

27. Cement and concrete shall not be poured within 150 feet of a stream if precipitation is predicted within 24-hours. The Operator shall monitor the 7-day forecast. Cement shall not be poured in or near a flowing stream, to reduce the potential for significant adverse impacts to the stream, water, or biota.

28. The clean-up of all spills shall begin immediately. The Department shall be notified immediately by the Operator of any spills and shall be consulted regarding clean-up procedures.

29. The Operator shall comply with all litter and pollution laws. All contractors,

subcontractors and employees shall also obey these laws and it shall be the responsibility of the operator to insure compliance.

30. Any equipment or vehicles driven and/or operated within or adjacent to the stream/lake shall be checked and maintained daily, to prevent leaks of materials that if introduced to water could be deleterious to aquatic life.

31. Stationary equipment such as motors, pumps, generators, and welders, located within or adjacent to the stream/lake shall be positioned over drip pans. Stationary heavy equipment shall have suitable containment to handle a catastrophic spill/leak. Clean up equipment such as extra boom, absorbent pads, skimmers, shall be on site prior to the start of activities adjacent to the streambed or lake.

32. No equipment maintenance shall be done within or near any stream channel or lake margin where petroleum products or other pollutants from the equipment may enter these areas under any flow.

33. When work in a flowing stream is unavoidable, the entire stream flow shall be diverted around the work area by a barrier, temporary culvert, new channel, or other means approved by the Department. Construction of the barrier and/or the new channel shall normally begin in the downstream area and continue in an upstream direction, and the flow shall be diverted only when construction of the diversion is completed. Channel bank or barrier construction shall be adequate to prevent seepage into or from the work area. Diversion berms shall be constructed of onsite alluvium of low silt content, inflatable dams, sand bags, or other approved materials. Channel banks or barriers shall not be made of earth or other substances subject to erosion unless first enclosed by sheet piling, rock rip-rap, or other protective material. The enclosure and the supportive material shall be removed when the work is completed and removal shall normally proceed from downstream in an upstream direction.

34. Flow diversions shall be done in a manner that shall prevent pollution and/or siltation and which shall provide flows to downstream reaches. Flows to downstream reaches shall be provided during all times that the natural flow would have supported aquatic life. Said flows shall be sufficient quality and quantity, and of appropriate temperature to support fish and other aquatic life both above and below the diversion. Normal flows shall be restored to the affected stream immediately upon completion of work at that location.

35. Operator shall take all necessary steps to contain sediment and reduce stream turbidity when the work area(s) are rewatered. Operator shall install an appropriate sediment control device downstream of the work area to filter sediment. Acceptable materials include silt fence, straw bales, or other appropriate devices to prevent sediment runoff during rewatering activities. Silt control shall remain in place only until the water running through the work area is clear of sediment.

36. Silty/turbid water from dewatering or other activities shall not be discharged into the stream. Such water shall be settled, filtered, or otherwise treated prior to discharge.

37. Upon Department determination that turbidity/siltation levels resulting from project related activities constitute a threat to aquatic life, activities associated with the turbidity/siltation, shall be halted until effective Department approved control devices are installed, or abatement procedures are initiated.

38. If an off-stream siltation pond/s is/are used to control sediment, pond/s shall be constructed in a location, or shall be designed, such that potential spills into the stream/lake during periods of high water levels/flow are precluded.

39. When operations require moving of equipment across a flowing stream, such operations shall be conducted without increasing stream turbidity. For repeated crossings, the operator shall install a bridge, culvert, or rock-fill crossing as specified in comments below, and approved by the Department prior to placement.

Equipment and Access:

40. Staging/storage areas for equipment and materials shall be located outside of the stream/lake.

41. Access to the work site shall be via existing roads and access ramps

42. Access to the work site shall be via existing roads and access ramps. If no ramps are available in the immediate area, the Operator may construct a ramp in the footprint of the project. Any ramp(s) shall be removed upon completion of the project.

43. No equipment shall be operated within the dripline of native trees, which are not proposed for removal. Protective fencing shall be placed around the dripline of native trees to prevent compaction of the root zone.

44. Vehicles shall not be driven or equipment operated in water covered portions of a stream or lake, or where wetland vegetation, riparian vegetation, or aquatic organisms may be impacted.

45. Vehicles shall not be driven or equipment operated in water covered portions of a stream or lake, or where wetland vegetation, riparian vegetation, or aquatic organisms may be impacted, except as otherwise necessary to complete authorized work.

46. One vehicle may be driven in wet portions of the stream/lake to accomplish the work authorized by this Notification. This work is only authorized when the vehicle is completely clean of petroleum residue and water levels are below the gear boxes of the equipment in use or lubricants and fuels are sealed such that inundation by water shall not result in leaks.

47. The equipment and vehicles shall be clean and free of any weed seeds.

Fill and Spoil:

48. Fill length, width, and height dimensions shall not exceed those of the original design/installation or the original naturally occurring topography, contour, and elevation. Fill shall be limited to the minimal amount necessary to accomplish the agreed activities. Except as otherwise specified in this Notification, fill construction materials other than on-site alluvium, shall consist of clean silt-free gravel or river rock.

49. All fill materials shall be obtained from upland sources, and must be weed free.

50. Permanent spoil storage sites shall not be located within a stream/lake, where spoil can be washed back into a stream/lake, or where it will cover aquatic/riparian vegetation, intact upland vegetation, and areas documented with sensitive species.

51. Temporary spoil piles may be placed in the streambed during the work day; the quantity of material that is used within one work day period may be placed in the streambed at one time. At the end of the work day all temporary fill material shall be relocated outside of the streambed.

52. Spoil shall not be placed on the stream side slope, or where it could enter the stream. Spoil shall not be placed over vegetation except with prior notice to and authorization by the Department.

Structures:

53. Structures and associated materials not designed to withstand high water flows shall be moved to areas above high water before such flows occur.

54. The Operator shall construct an effective water velocity dissipation device at the outlet structure to minimize erosion.

55. Installation of bridges, culverts, or other structures shall be such that water flow (velocity and low flow channel width) is not impaired. Bottoms of temporary culverts shall be placed at or below stream channel grade. Bottoms of permanent culverts shall be placed below stream channel grade.

56. Plans for design of concrete sills and other features that could potentially impede fish migrations shall be approved by the Department.

57. Storm drains lines/culverts shall be adequately sized to carry peak storm flows for the drainage to one outfall structure. The storm drain lines/culverts and the outfall structure shall be properly aligned within the stream and otherwise engineered, installed and maintained, to assure resistance to washout, and to erosion of the stream bed, stream banks and/or fill. Water velocity shall be dissipated at the outfall, to reduce

erosion.

58. The Operator shall place structures on properties so that fire clearance activities will not impact vegetation within the stream bed, banks and channel, mitigation areas or associated buffer areas.

SPECIALIST REPORT

RESOURCES: CULTURAL

Burned Area Emergency Report-The Poomacha Fire

Resources: Cultural Resources

Final Technical Specialist's Report

Resources: Archaeology/Cultural Resources

Fire Name: Poomacha Fire

Month/Year: November 2007

Authors Names:

-Don Perez, Archaeological Specialist, California State Parks, Southern Service Center, 8885 Rio San Diego Drive Suite 270, San Diego, CA 92108.

Office (619)688-3374.

-Mathew Mandich, Archaeological Specialist, California State Parks, Southern Service Center, 8885 Rio San Diego Drive Suite 270, San Diego, CA 92108.

Office (619)688-3374.

-Erin Smith, Archaeological Project Leader, California State Parks, Southern Service Center, 8885 Rio San Diego Drive Suite 270, San Diego, CA 92108.

Office (619)688-6108.

Note These appendices contain confidential information regarding archeological site locations, portions of this report have been removed from public copies in accordance with the policy of the Office of Historic Preservation as adopted by the State Historical Resources Commission under the authority of Public Resources Code 5020.4.

I. Resource Condition Assessment

A. Resource Setting

The 49,410-acre Poomacha Fire burn area includes portions of the La Jolla, Pauma, Yuima, Rincon, and Pala Indian reservation land, as well as the state and federal land reserves of Cleveland National Forest and Palomar Mountain State Park. The respective agencies and tribal organizations are responsible for conducting their own post-fire assessments within these areas. The primary concern of this project was to focus on lands designated as State Responsibility Areas (SRA). This report specifically focuses on the cultural resources within the SRA affected by the Poomacha Fire.

CONFIDENTIAL ARCHAEOLOGY INFORMATION

CONFIDENTIAL ARCHAEOLOGY INFORMATION

CONFIDENTIAL ARCHAEOLOGY INFORMATION

CONFIDENTIAL ARCHAEOLOGY INFORMATION

References

Site records on file at the South Coastal Information Center, San Diego State University, San Diego.

The Secretary of the Interior's Standards and Guidelines, Code of Federal Regulations, 36 CFR Part 61.

Instructions for Recording Historical Resources, Office of Historic Preservation P.O. Box 942896 Sacramento, CA 942196-0001

Native American Heritage Commission, 915 Capitol Mall, Room 364 Sacramento, CA 95814.

California Environmental Quality Act (CEQA). California Code of Regulations, Title 14, Division 6, Chapter 3.

California Fire News

Poomacha Fire

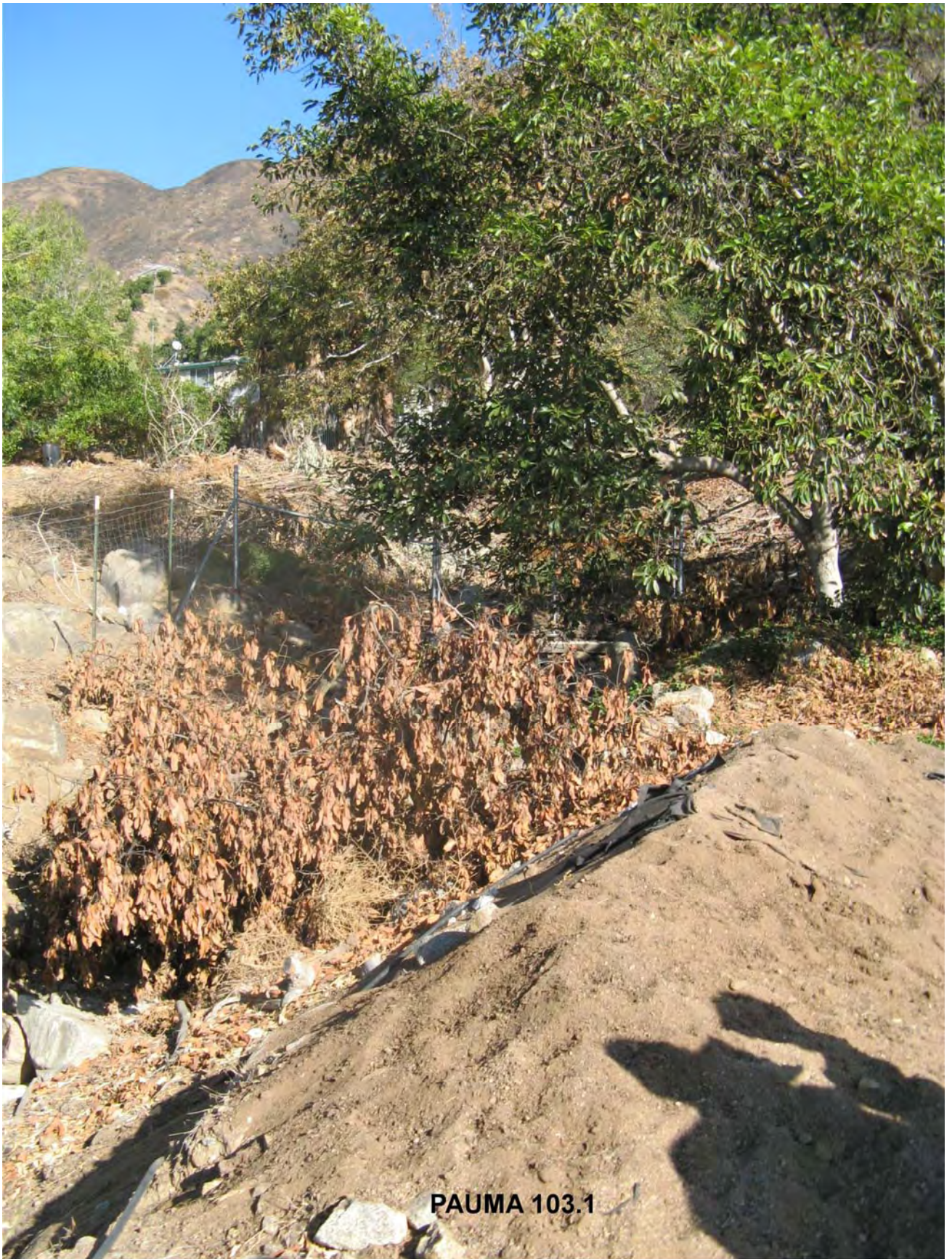
<http://calfire.blogspot.com/2007/11/poomacha-fire-49410-acres-100-final.html>

APPENDIX 4

PALOMAR 101



PAUMA 102





PAUMA 103.2



PAUMA 104.1





PAUMA 104.4



